

GREEN SCHOOLS: ENVIRONMENTAL STANDARDS FOR SCHOOLS

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

SECOND SESSION

OCTOBER 1, 2002

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ONE HUNDRED SEVENTH CONGRESS
SECOND SESSION

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GREEN SCHOOLS: ENVIRONMENTAL STANDARDS FOR SCHOOLS

TUESDAY, OCTOBER 1, 2002

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The committee met, pursuant to notice, at 10:13 a.m. in room 406, Senate Dirksen Building, Hon. James M. Jeffords (chairman of the committee) presiding.

Present: Senators Jeffords, Clinton, and Carper.

OPENING STATEMENT OF HON. JAMES M. JEFFORDS, U.S. SENATOR FROM THE STATE OF VERMONT

Senator JEFFORDS. Good morning, the hearing will come to order. I am sorry for the delay, but there is a little meeting over at the Pentagon that was of some interest to all of us.

I would like to begin by thanking our witnesses both for being here today, and for your dedication to promoting green schools.

I also understand that we have parents of school children in the audience who have personal interests in today's hearing. I appreciate, and I am sorry for the unfortunate experiences that bring us here today.

The statistics are truly alarming. More than 14 million children attend schools with an environmental problem. More than \$320 billion will be needed to bring these schools up to healthy standards nationwide.

If the Federal Government fully funded its share of special education programs, the localities would have the ability to provide more funding for green schools. More than 1,100 public schools are built within a half mile of a toxic waste site.

The statement of Lois Gibbs, who is with the Center for Health, Environment and Justice, will discuss in our second panel the undeserved struggle parents have in these communities.

I am very disturbed by this information. With all the concerns plaguing today's parents, the health of a child's school should not be an issue. Parents should be assured that the building and location in which their child spends the majority of his or her time is safe and healthy.

It is distressing that any child should be confronted with a possible developmental impairment as a result of the school he or she attends.

I am pleased that EPA is here today with us. It seems that EPA is doing more than any other Federal agency in the area of healthy schools.

I look forward to hearing more from EPA's initiatives, such as the Tools for Schools Program. I am, however, sorry that the Department of Education and Energy could not be here with us today. I hope to work with the Department of Education in the coming months. I also hope the Department of Energy becomes more engaged in green school initiatives.

I recognize and appreciate the local nature of issues related to schools. In my own State of Vermont, a Healthy Schools Bill was signed into law in the Spring of the year 2000. This is a positive step forward to address the indoor air quality in Vermont schools, and to limit exposure of Vermont's teachers and children to potentially harmful environments.

However, there is much that can be done at the Federal level. First, we need good scientific data to better understand the link between outdoor and indoor environments, and the student health and learning.

Second, in the context of school siting, construction and renovation, we need Federal guidelines that take a child's small size and the development needs into consideration.

Finally, we need to invest long-overdue resources and coordinate Federal, State, and local efforts to improve the health of our schools.

Studies indicate that the benefits of green schools are numerous. Green schools can save 40 percent or more on energy costs, as Alex Wilson discusses in his testimony. Mr. Wilson, from Vermont's BuildingGreen, Inc., is on our second panel, today.

Students in schools that rely primarily on daylighting perform up to 26 percent better on standardized tests than their counterparts in poorly lit schools. Let me repeat that. Students in schools that rely primarily on daylighting perform up to 26 percent better on standardized test than their counterparts in poorly lit schools.

Claire Barnett, with the Healthy Schools Network, will point out in her statement today that an estimated 17 million school days were lost in 1997 due to asthma. Taking steps to address air pollution, leading to asthma, would mean higher school attendance.

These are the kind of statistics I prefer. I am hopeful that today's hearing sheds some light on how to achieve greener schools, and thus better health for our students and teachers.

I have highlighted points that will be made by each witness in our second panel. A lot of thought and consideration has gone into these testimonies. I urge EPA, as well as the Department of Education and Energy, to carefully review our witnesses' statements.

There is no greater investment that one can make than in our children and their centers of learning and socialization. I look forward to working with all of you to promote green schools.

Our first witness is Ramona Trovato. She is the Deputy Assistant Administrator of the Office of Environment, at the Environmental Protection Agency. She is a former Director of the Office of Children's Health Protection at EPA. We are so pleased to have you with us.

Ms. TROVATO. Thank you so much. It is a pleasure to be here this morning.

Senator JEFFORDS. Please proceed.

STATEMENT OF E. RAMONA TROVATO, DEPUTY ASSISTANT ADMINISTRATOR, OFFICE OF ENVIRONMENTAL INFORMATION, ENVIRONMENTAL PROTECTION AGENCY

Ms. TROVATO. Thanks, I am really pleased to be here today on behalf of Administrator Whitman and EPA. We are here to discuss our efforts to make schools safe and healthy places for our children to learn, and I am particularly happy, because this is the beginning of Children's Health Month, and I am happy to be able to play a role in kicking that off.

Protecting our children's health is a priority of this Administration and of EPA. Children are our most precious asset, and may be more vulnerable to many environmental exposures than adults.

Asthma is the leading chronic illness in children, and the cause of 14 million missed school days every year. Allergens, including those from mold, cockroaches, dust mites, animal dander and other things commonly found in school environments are known to trigger asthma attacks. Outdoor air pollution is also a trigger for asthma attacks.

Children in our Nation's schools may also be exposed to many other contaminants, including chemicals in everything from cleaning products and art supplies, to the materials and furnishings in school buildings.

They may also be exposed to pesticides, radon, fumes from idling school buses, and potentially even to mishandled sources of mercury and asbestos.

More than 53 million students, and about three million teachers and staff, almost 20 percent of the United States population spend much of their time in school. Unfortunately, in far too many cases, our schools are old, and because of budget shortfalls are inadequately maintained, leading to a host of environmental problems that can impact children, staff, and learning.

If a child suffers an asthma attack in class, or is not in school because of asthma, if the school is closed because of an environmental health or safety episode, if the ventilation system is providing little or no fresh air, that child may not be up to learning to his or her potential.

Within EPA, we have been working very hard to help schools address environmental issues that affect learning. For example, while there is no known cure for asthma, asthma attacks can be prevented by reducing exposures to environmental triggers, and by ensuring that all children receive appropriate medical care. EPA is a committed partner in this battle against asthma.

EPA has been a leader in the effort to help schools address indoor air problems through its widely acclaimed indoor air quality Tools for Schools program. I brought you a kit, in case you would like to see it.

We have worked with 10,000 schools who are already using the program. In fact, New York City schools and the L.A. Unified School District, two of the largest school districts in the country, are committed to using Tools for Schools as part of their health and safety programs.

Last year, EPA released specific guidance to help schools identify and fix mold and moisture problems. We are very proud of our new little book on that. Just last week, we released a companion guide

on preventing and cleaning up mold in homes, which we have here, as well.

We are continuing to work with other Federal agencies though, and especially CDC, to better understand the health effects from mold, so we are doing more research in that area.

Soon, EPA will release new Web-based guidance devoted to school design, construction, and renovation. This new guidance will draw from EPA's expertise, as well as excellent work done in the private sector in the State of California, and especially the California collaborative for high performance schools.

EPA strongly encourages school districts to embrace the concept of designing and building high performance schools. These are schools with a whole building integrated design to promote health and performance, while saving energy, resources, and money.

Energy efficient design can result in reduced operating costs and these energy savings can pay for any additional up-front costs very quickly.

These savings do not even include the potential benefits of improved health and performance of the students and the folks who work in schools.

EPA is very aware of the resource constraints that schools face, and so our goal is to allow schools easy access to our environmental programs. We are doing this through better coordination and integration within EPA, and we are developing partnerships with schools, school districts, and organizations that represent nurses, teachers, facility planners, managers, school administrators, architects, engineers, and parents.

To that end, I am pleased to report to you today that just a week ago, we inaugurated a new Healthy School Environments Web portal. This new Web site will provide one stop access to EPA resources for schools, as well as those from other Federal agencies, States, communities, and NGOs.

Within the Federal family, the President's Task Force on Environmental Health Risks and Safety Risks to Children, co-chaired by Administrator Whitman and Secretary Thompson, identified school environmental health as a priority, and established an inter-agency work group.

This schools work group is tasked with identifying opportunities for collaboration and coordination of Federal efforts, and is co-chaired by EPA, the Department of Education, and the Department of Health and Human Services.

The work group has developed an inventory of Federal programs, which should be available later this year, and is working to develop a strategy for improved Federal collaboration.

In conclusion, we are committed to working within the Federal community, with States and tribes, local governments and communities, schools, and NGOs to promote children's health in our Nation's schools.

I look forward to working with you and others to make our schools the healthiest possible environments for our kids to learn. I thank you for the opportunity to be here today, and I am happy to answer any questions.

Senator JEFFORDS. Well, thank you, Ms. Trovato. Your testimony is alarming.

Ms. TROVATO. It is alarming, yes.

Senator JEFFORDS. We appreciate your candor, and I look forward to working with you.

Let me read back to you some of the statistics you provided the Committee in your opening testimony. Asthma is the leading chronic illness in children, and the cause of 14 million missed school days each year.

Next, hundreds of thousands of children, living in the United States, still have blood lead levels high enough to impair their ability to think, concentrate and learn.

You also report that children, while in our Nation's schools, are exposed to many chemicals, fumes, and pesticides that lead to dramatic impacts on their health and learning.

You also report that frequently, schools across America are being evacuated or permanently closed due to environmental problems.

You outline that 40 percent of our schools are in unsatisfactory environmental condition, most of these in urban environments; and most alarming, minority children that attend these unsafe urban schools that have poor outdoor and indoor air quality are four to six times more likely to die—yes, die—from asthma. That is alarming.

Finally, you conclude by saying the following: "Nevertheless, many schools continue to provide less than ideal conditions to facilitate learning, and many pose unnecessary risks to the health of our children."

From what you report, every day we send our children into an environment that may undermine their ability to learn, harm their health, and increase their risk of death.

These are our schools we are talking about. Our children trust us to do what is right, to protect them, and provide a safe environment for them to learn and thrive. Clearly, we are failing. We can and we must do a lot more to protect our children in this Nation.

I know you outline a number of steps that EPA is taking to improve the environment in our children's schools, but there is much that we can do.

Please tell me why our other Federal agencies, such as the Department of Education and Energy, are not doing more to support EPA's efforts. Is there any coordination there, and are they not aware of the problem?

Ms. TROVATO. We are very concerned about kids' health, as well. For the last 5½ years, I have been working on children's health issues.

I was surprised when I learned the extent of the number of kids with asthma and the number of missed school days, and the number of kids with elevated blood lead levels. Even though getting lead out of blood has been a huge public health success story, there are still hundreds of thousands of kids with elevated levels of lead in their blood.

So, we have been working long and hard with the other Federal agencies, as well as with other partners around the country, to try and deal with these issues.

We have very close working relationships with the Department of Health and Human Services, and an inter-agency Federal asthma strategy to try and find ways to not only prevent exposures

that trigger attacks, but also to make sure that kids are getting the medical treatment they need.

For blood lead levels, we are working really closely with the Department of Health and Human Services and HUD, because most of the exposures to lead are in older homes, where there is toxic, hazardous lead paint. So we have a very strong relationship there.

In terms of the schools initiative, we have an extremely strong relationship with the Department of Education. They are helping us co-chair the group on schools.

We compliment their focus on education, because we are trying to help find ways to make schools better places to learn, so kids can focus on learning and not be worried about if they are safe and healthy in those schools.

The Department of Energy is a key partner, from the point of view of looking at how we make schools more energy efficient; but at the same time, make sure the indoor air quality is such that we are promoting learning, as well as saving money.

So we are making every effort to have a really strong partnership with all of the other Federal agencies in the Government. There is always more we can do. There are always more programs we are finding, where we can partner.

The Web site, the Healthy School Environments Web portal, that just went up within the week, has information about what the other Federal agencies are doing, as well as what we are doing.

So there is a strong collaboration, I think, with all of these Federal agencies, and we are going to continue doing that. As we develop the strategy and identify what each agency can do and how they fit in, I think it will help us to promote even more work and more work together, that makes it better for kids in schools.

Senator JEFFORDS. There are many differences among the States in how they fund and regulate school facilities, as revealed by studies conducted by the Environmental Law Institute. How can the EPA, at the Federal and regional levels, ensure that the Federal agency outreach on school environmental programs is consistent with local and State regulations, and integrated with local funding budgets?

Ms. TROVATO. That is a tough one, Senator. We have the Web site that all schools can sign in on, or school districts or States, to look at what we have to offer, in terms of environmental programs that can help out schools.

The other thing that is happening is, we have 10 regions around the country, like many other Federal agencies. Each of those regional offices is, in different ways, reaching out to the schools, where the schools want to partner with us, and working with them to try and give them what they need.

In our Region I, which is our New England Region, for example, we have a program where we are trying to educate schools about how they can get rid of old chemicals that they do not want anymore, and how they can handle them safely and get rid of them safely. We have different programs in different regions, depending on what that State or that school wants.

So in some cases, we are not consistent, simply because the issues from region to region in our country are different. So we are trying to focus on what those people in those regions want.

We are also trying to partner with other Federal agencies in those regions. In the past, in Region I, again, in our New England Region, we have partnered on asthma, where we got together HUD, HHS, and EPA to look at the asthma issues there, to try and find ways to reduce asthma episodes in those States.

Senator JEFFORDS. What role do you think EPA should play in the labeling of building materials and products according to their emissions; and how can the agency help schools identify safe products?

Ms. TROVATO. A lot of things are already labeled. Pesticides are already labeled, solvents, cleaning materials are already labeled. Energy star materials are already labeled.

But one of the things we are trying to do right now, not exactly in the labeling mode, but at least in the education mode, is provide in our new Web page that will be up the end of this year, our design criteria for things that people should look at when they are trying to buy new materials in setting up new schools.

We have some principles for them to look at, in terms of materials, using the least toxic materials; those that emit little or no odor. They are easy to clean. They are not susceptible to moisture damage, so we can avoid getting to molds.

So we are giving them information about questions they should ask when they buy materials, and we also, for some things, pesticides and cleaning agents, they are already labeled. So we are making a step forward to helping schools choose more healthy materials.

Senator JEFFORDS. EPA's Tools for Schools Program is a good step in the right direction; however, it is voluntary. What greater role can EPA play in implementing actual indoor air quality standards; and how would these standards be defined?

Ms. TROVATO. EPA has authority to do research and disseminate information about indoor air quality. Tools for Schools is one of our premier products that we offer to help.

In terms of setting standards, there are some standards that are set just because of the other statutory authorities that we have; for example, pesticide usage inside buildings. There is information on that and requirements on that, and what pesticides you can use, and at what rates you can apply.

We have a lot we can offer in terms of information and guidance, but we do not set indoor air quality standards. To a large extent, we do not have a lot of information about what materials, chemicals, are in buildings, in schools; and we do not have the research to know what is safe and what is not safe.

Senator JEFFORDS. The agency has focused considerable attention on indoor air quality in the schools. Have you looked at other issues like daylighting, that might affect a student's health and performance?

Ms. TROVATO. Now I have personally read about daylighting and know that it has been associated with student performance, but I do not know if we have done work on that issue.

I am told, we have not, but we work with the Department of Energy and others. That was Bob Axelrad from EPA, who is our lead schools person.

Personally, I found daylighting to be a big help for myself.

Senator JEFFORDS. Given the high priority need to protect children from toxic hazards, what Federal legislative or Administrative initiatives are needed to remove and dispose of toxic hazardous materials in their supplies at schools?

Ms. TROVATO. I think we have all the authority we need. I think education is what we need to offer to help schools. Because we do know a lot about how to handle and dispose of them safely.

So as in our New England Region, where we have reached out to schools and offered them education about how to handle those materials, I think it is something we could do in more of our regions, and make sure that folks knew how to handle those materials.

Senator JEFFORDS. You mentioned more research is needed. Can you be more specific?

Ms. TROVATO. There are many chemicals in our environment for which we have not done a lot of health effects research. So there is always more health effects research, I think, that is necessary.

In the last 5 years, the agency has funded five centers to focus on children's health. Well, there are 12 centers; eight of which are going to come up for renewal very soon, and we are going to continue to fund them jointly with NIEHS, to help focus on children's health issues.

In addition to this, we are also very interested in what effects exposures to urban pollutants, to pesticides, may have for a variety of different sub-populations of kids, such as kids who live in the inner city and kids who live in farming communities. So we are trying to learn more about how children are specifically affected, perhaps differently than adults, by doing this research.

Senator JEFFORDS. What Federal and State initiatives and resources are needed to ensure that in 5 years, at least half of the schools will have disposed of old and outdated toxic products, and adopted pollution prevention purchasing for products and suppliers in common use?

Ms. TROVATO. That is a big question.

Senator JEFFORDS. Yes.

Ms. TROVATO. I probably need to get back to you on that one, because that is such a big question.

We can do more education and outreach from each of our regions to let the schools know, or the school districts know, how they can handle those materials. But the rest of that, that is a bigger question, and I really need to get back to you on that.

Senator JEFFORDS. We would appreciate it if you spend some time on it, after we finish our discussion.

Ms. TROVATO. OK.

Senator JEFFORDS. Why is the EPA deliberating cutting funding for these important centers, especially when the number of children who suffer from asthma and other illnesses from potential environmental causes are on the rise?

Ms. TROVATO. We just have not decided at what level we are going to fund the centers. We think the centers are really important, and we are committed to children's health research. I cannot tell you when we are going to decide how much funding we are going to contribute with NIEHS and HHS to that.

We do want to also focus, I should say, on older Americans, as well as on children, because we know that many of the things that affect kids also affect older Americans. But then there are different things that also affect older Americans.

Asthma is an even worse problem for older folks than it is for children, in terms of how well they survive asthma attacks. So we also want to spread our limited money to look at populations such as older Americans, as well as children.

We certainly do not want to short-change kids. They have got a long, long life, and we want to make sure it is as high a quality as possible. But we also want to make sure the quality of all the lives of the citizens are well protected and we promote their health.

Senator JEFFORDS. In December of 2000, Congress appropriated \$1.2 billion for school renovation grants to address health and safety issues.

The funds are now in use in the States. Congress has also established a continuing qualified zone Academy Bonds Program, that can be used to help schools with renovations and construction.

What legislation or Administrative initiatives are needed to integrate EPA's environmental expertise with the Department of Education's available funding?

Ms. TROVATO. So far, we are working really well with the Department of Education. I do not think we need any additional authorities or direction.

The Department of Education has recognized that we have a great deal of expertise in this area, especially in our Indoor Environments Program. So they are reaching out to us as much as we are reaching out to them. I think we are doing pretty well with the Department of Education, in terms of sharing knowledge and expertise.

I think that we have a good partnership, and that as we continue to move forward and work together, that the understanding of how these issues affect how kids learn will become more readily apparent to more folks, and that partnership will grow.

Senator JEFFORDS. Well, I hope so.

Ms. TROVATO. Yes.

Senator JEFFORDS. I want to keep in touch with you on these things. I am going to be looking to try and see what the funding situations are, to see what we, at the Senate level should be doing to make sure the resources are available and necessary.

Ms. TROVATO. Thank you so much. It is always important to shine light on these issues and keep the focus where it belongs. The kids are our future, so we appreciate that; thanks so much.

Senator JEFFORDS. Thank you.

Senator Clinton.

**OPENING STATEMENT OF HON. HILLARY RODHAM CLINTON,
U.S. SENATOR FROM THE STATE OF NEW YORK**

Senator CLINTON. Thank you, Mr. Chairman.

Thank you so much for holding this very important hearing. I know that our witness is from the Environmental Protection Agency and not the Education Department.

But I am going to take this opportunity, since I assume you do represent the Administration, to some extent, to continue my ef-

forts to get a response from the Administration, and most particularly, the Department of Education.

I incorporated an amendment in the No Child Left Behind Act that was aimed at providing resources and technical assistance to help schools get rid of environmental health pollutants, such as mold, lead, asbestos, and many other problems that had been brought to my attention by the good work of some of the people we are going to hear on the next panel.

In spite of numerous requests that I have made about this program, the Administration zeroed out funding for it this year and in next year's budget.

I am very concerned, because I think the Healthy and High Performance Schools Program was a recognition by the Congress, in passing that landmark education, that the health of our schools had an impact on the health of our children.

So, I would appreciate it if the Environmental Protection Agency would talk to the Department of Education, and perhaps report to this Committee as to what the steps are going to be to try to implement legislation that was adopted. I am very appreciative of any help you can give me.

Now more closely related to the EPA is, earlier this year, I asked Administrator Whitman to establish environmental guidelines for the siting of schools. I expressed an interest in having this become a priority of the President's Task Force on Environmental Health Risks and Safety Risks to Children.

Again, I would like an update on both the establishment of the guidelines and on the Task Force, in general. I think it is imperative that the Task Force continue operating.

I would like to know if President Bush intends to allow the Task Force to continue operating beyond its current expiration date of April, 2003. Finally, does the EPA, in your opinion, currently have the authority to set standards for the indoor school environment or, for that matter, any indoor environmental standards, and to conduct indoor monitoring in schools?

Ms. TROVATO. That is a lot.

Senator CLINTON. Well, we have been working on this for quite awhile.

Ms. TROVATO. Let me start at the top, which is the requirement on high performance schools and the work of the Department of Education.

Despite the fact that I am with the Federal Government, I really cannot answer for the Department of Education. So I would love it if you would allow me to get back to you on that piece.

Senator CLINTON. Thank you very much.

Ms. TROVATO. We are working closely with the Department of Education to offer our expertise on environmental issues in and around schools, whenever we can.

So we think that that is a growing and good relationship that we have with them. We think that because of the new law and your efforts, the Department of Education has begun to recognize that the school environment, itself, can affect how well you learn.

I think that is a new recognition. I am not sure people, or at least not a lot of people, were aware of that for a long time. So that is a good thing.

In terms of environmental guidelines for siting schools, it is a local issue. However, we are providing, in one of our Web sites, on the design Tools for Schools site, which should be final the end of this year, guidelines for siting schools.

We also have, on EPA's Web site, a tool called Enviro-facts. You can log in there, put in your zip code, and you can find out what sites are regulated by EPA or the State in that area. So that will help a lot to identify what is there or what has been there, and help schools and school districts make good decisions.

In terms of the Task Force on Children's Environmental Health and Safety Risks, it is continuing to operate. The schools work group was formed at the last meeting.

That has been working long and hard. That will have its product, an inventory of the Federal activities on schools, up by the end of the year on our Web site, as well as develop a strategy on how we are going to collaborate to better help schools.

The asthma work group continues to function, both HHS and EPA, trying to identify better ways to reduce asthma. In fact, we have a very strong relationship with the States, through the Environmental Council of the States and the Association of State and Territorial Health Officials, to look at ways to reduce asthma attacks.

Also, the Lead Task Force continues to work, with HUD in the lead. Congress increased the grant funding to HUD, and it is focused on the HUD housing, to reduce the lead hazards in those houses.

We are also partnering with HHS and CDC to better understand the links between environment and health by establishing a health tracking system.

Their grants should be announced very shortly for environment and health tracking. We are already working closely with them, to make sure that the data standards that they come up with, and the data standards that we already have in our environmental network, are compatible so we can exchange and share information.

Because one of the things that we and they are very interested in, from a public health perspective, is where are the chronic diseases that people are suffering; what are the environmental conditions in those places; and is there a link between the two, that we could understand better and, therefore, promote health better through environmental action.

We are really excited about this one, and I know CDC is, as well. So we are looking forward to them getting their site up and running, and joining it through the network with our site, so that we can have more information on that.

EPA does not have authority to set standards for indoor environments. We have authority to do research and disseminate information, and our Tools for Schools is one of our packages that we have disseminated.

We can conduct monitoring activities in schools, and we have in some specific instances. We do not have a generic program of understanding, through monitoring, of what is happening in our schools.

We have done a study of 100 large office buildings throughout the country, in different climatic regions, to understand what is

happening in those buildings. We are continuing the analysis of that information, so that we can see if there are any conclusions we can draw from that study. We have not done a similar study in schools.

Senator CLINTON. Well, I want to thank Ms. Trovato for her testimony, Mr. Chairman. I know that the health tracking issue is one that you have worked on with me, and Senator Reid and others. I think it is the next frontier, in terms of environmental work.

We have a piece of legislation that we would love to work with the Administration on getting in place. Because I could not agree with you more, that we have done a good job tracking infectious disease. We have not done a good job tracking chronic disease.

I think you were at the Fallon, Nevada hearing, where you testified.

Ms. TROVATO. Yes.

Senator CLINTON. We were looking for the linkage with the cancer cluster that has been so difficult to understand, that has claimed lives and has just been devastating to about a dozen families in that very small farming town.

So I hope that we can really make an issue of health tracking. Similarly, I think it is also now apparent that we need standards on indoor air, and we need responsibility, clearly defined, as to who is responsible, in the event of man-made or natural disasters that create challenges to indoor air, and to do some monitoring in just ordinary circumstances.

Clearly, this has been a huge issue for us in New York, in Lower Manhattan. It was one of those problems that fell between the cracks, you know, where the city was asked to take responsibility. They clearly did not have the expertise or the ability to do it. They turned to EPA.

We finally now have indoor air monitoring occurring in residences, but this needs to be fixed for the future. This is a significant issue.

Clearly, too, I think we need standards to that we can be conducting more regular monitoring, and not wait for a disaster; for parents to know that the indoor air in their homes, in their apartment buildings, in their schools is safe.

Because I think we are all learning that we have put so much stuff into our environment, thousands and thousands of chemicals, since World War II, that have never been tested, and their interactions with each other are totally unknown.

I mean, for heaven's sake, we pick up the paper now and read that, you know, we are now testing for the safety of french fries and potato chips, because of chemical reactions with starch and glucose, at high temperatures, that can create a cancer-causing element that does cause cancer in animals. I mean, those are things we did not know.

Now that we have more notice, we have to do more work. So I thank you for your commitment. You have been very, very helpful, and I look forward to working with you, to try to answer some of these questions, set the standards we need, and then provide the resources to monitor and implement what we know is best for our children in the future.

Ms. TROVATO. Thank you so much.

Senator JEFFORDS. Well, thank you, and thank you, Senator, for an excellent dissertation here. I look forward to working with you. That is the final question we have for you at this time.

Ms. TROVATO. Thank you, Mr. Chairman; thank you, Senator.

Senator JEFFORDS. But we reserve the right to bludgeon you through the mail.

[Laughter.]

Senator JEFFORDS. Our next panel is Ms. Claire Barnett. She is the executive director of the Healthy Schools Network, based in Albany, NY.

Mr. Alex Wilson is president of BuildingGreen, Inc., based in Brattleboro, VT. Mr. Wilson is here representing the U.S. Green Buildings Council.

Ms. Lois Gibbs is the executive director of the Center for Health, Environment, and Justice, based in Falls Church, Virginia.

Senator CLINTON. Mr. Chairman, if I could just say a word of introduction, Claire Barnett from the Healthy Schools Network in Albany has been instrumental in illuminating the problems that schools face, not just in New York, but around the country.

The network which she directs provides technical assistance to parents, teachers, school administrators and others, who are interested in the health of our schools.

Of course, Lois Gibbs is an environmental heroine who, while raising her family in Love Canal near Niagara Falls in Upstate New York, discovered that her home and those of her neighbors were sitting next to thousands of tons of toxic chemicals.

This was in 1978, and I think it is fair to say that the modern environmental concern about toxic chemicals, about what needs to be done, about who bears responsibility really can be dated to what Lois did, after she galvanized her neighbors, and led to tremendous response throughout our country, and the relocation of 800 Love Canal households.

Today, she is still fighting the good fight, as executive director of the Center for Health, Environment, and Justice. I am delighted that both Ms. Barnett and Ms. Gibbs could be here today.

Senator JEFFORDS. Well, thank you, Senator.

My first question is for Claire Barnett.

Oh, you all have statements you would like to give; yes, right.

[Laughter.]

Senator CLINTON. He wants to get right to it. He is chomping at the bit here.

[Laughter.]

Senator JEFFORDS. Claire, please proceed.

STATEMENT OF CLAIRE BARNETT, EXECUTIVE DIRECTOR, HEALTHY SCHOOLS NETWORK

Ms. BARNETT. Thank you very much.

Thank you, Senator Jeffords and Senator Clinton, those were lovely introductions, and we are very, very grateful to this Committee for holding this hearing. We consider it very significant.

My name is Claire Barnett. I am executive director of the Healthy Schools Network. We do environmental health research information and advocacy.

Today, on October 1st, which is the first day of Child Health Month, we are here representing the 55 million students and school personnel, about 20 percent of the Nation's population, who are in school today.

Unlike this room, their buildings are much more like what we see on the posters over here: dilapidated rooms, moldy ceilings, falling apart buildings, children are all but wearing gas masks in their schools.

I am also here with some parents that I want to point out, who have traveled a bit to help tell the story: Joellen Lawson, a teacher from Connecticut; Jenna Orkin, from the schools of Ground Zero in New York City; Veronica Carella from Maryland; Grayling White from Tennessee; Bill and Judy Sazonski and their son, Will, are here; Robin Starinieri from Virginia. I think she will shortly arrive.

All of their lives, like the lives of many other people, have been adversely impacted by the conditions of schools. It is something that we need to change, and change as quickly as possible.

Americans spend 85 to 90 percent of their time indoors. The General Accounting Office reported in 1995 that over 14 million children were in schools that threaten their health. This includes indoor air pollution; lighting and plumbing deficiencies, and that means, the toilets do not work; ventilation problems; problems that do not go away on their own.

In fact, EPA has stated that indoor air pollution is one of the top five hazards to human health. The American Society of Civil Engineers has reported that our schools are in worse condition than any other infrastructure, including prisons.

At the same time, schools everywhere are enrolling more and more children with special needs: asthma, attention deficit, autism, severe allergies, learning disabilities. Seventeen percent of children under the age of 18 have been diagnosed with one or more developmental disabilities. These children may be especially susceptible to environmental problems in their buildings.

A Federal Executive Order on child environmental health that was reauthorized by President Bush, reaffirms that children are more vulnerable to environmental hazards than are adults. So our challenge is, how do we create healthier, greener workplaces for our children?

We have identified a number of different problems that we want to point out. I do not want to reiterate EPA's fine testimony on some of these points. But major indoor triggers of asthma can include irritants such as paints, cleaning agents, pesticides, perfumes, sealants, plastics, adhesives, insulation materials, animal and insect allergens, and environmental tobacco smoke. All of these are found in schools, including products which anti-drug abuse advocacy organizations classify as "huffable" products: spray paints, markers, and fixatives.

Any building which is in bad repair, like the one over on my right, is going to be subject to pest infestations. Basically, pests like what we like. They like a little food, a little water, and a nice place to sleep.

But for buildings that are falling apart, we give pests too many opportunities to settle in. The result of that has been the constant

application and routine application of highly toxic pesticide sprays, which cause their own problems with children.

What we do know from another GAO study that looked at poison control reports between 1993 and 1996, there were approximately 2,300 pesticide-related exposures involving individuals at schools.

Molds are also everywhere, and moldy ceiling tiles are a great example. They are completely preventable, but they are everywhere, indoors and out. There is no such thing as a mold-free environment.

Testing for molds is unreliable. It is unclear what EPA's authority is to deal with molds in indoor environments.

It is our belief that testing is more beneficial to vendors than it is to schools. The message from EPA and other public agencies that have looked at molds is that prevention is the best way out; it is cheaper than remediation: reducing humidity, stopping leaks, responding promptly to spills, and always taking public health complaints seriously the first time.

Chemical toxicants and biological agents in the classrooms are everywhere. One of the things we ask is, why we cannot have environmentally preferable purchasing practices taking place in schools; why schools cannot eliminate the hazardous and toxic products that are too often left behind in the storage room, after the chemistry teacher has retired, or after the biology teacher has retired? There is something left back in that closet that the next person in the door does not want to touch.

The presence of hazardous and highly toxic products in schools is a major, major issue. It needs to be addressed. Mercury is just one example. Other sources beyond the chemical labs also include art labs, vocational technology shops and so forth.

What was interesting is the Agency for Toxic Substances and Disease Registry has actually put out a study on evacuations from educational facilities. They found they are often caused by chemical spills or releases.

They also found, and when you stop to think about it, it is not too surprising, that when you evacuate an educational facility, the evacuees and the victims are younger and more numerous than those from any other institution.

The most common substances in these evacuations were mercury and tearing agents, and that actually means mace and pepper spray; hydrochloric acid; chlorine; ethylene glycol, and formaldehyde. There was absolutely no estimate of the cost to health, the cost to learning, or the cost of just school administration, or missed time. It is an extraordinary consumption of resources.

We all know that lead comes with old infrastructure and will always be found in paint dust and chips. Lead is associated with many, many different difficulties, including intellectual deficits. It has also been linked to problems with impulsivity and aggression.

Again, according to the General Accounting Office in 1995, schools built before 1980 were painted with lead paint. This means that most of the stock of America's schools does have lead paint.

There is an interesting lead issue, and a small story that goes with that, which is a new source that not many people understand. Many schools, years ago, had rifle teams, or shooting ranges. Some schools actually had shooting ranges indoors.

One of the things we have discovered about shooting ranges indoors is that they use lead in the ammunition, which means that building can be lead-contaminated.

We have asked the New York State Department of Health to release a study that it conducted 2 years ago, and we would like some help getting that study out. The study has been completed, but it has not been released.

They did do blood lead level testing on all the rifle team members, and discovered they all had elevated blood lead levels. If that, in fact, stands up to scrutiny, it is a major lesson for schools everywhere in the country, not just in the few places in New York where the investigations were done.

Basically, there is no system to protect children. Not one of the workplace standards that have been set to protect adults can be used to protect children, who are compelled to be in school, and none can be invoked by children or parents, as the parents with us here today can tell you.

Parents cannot take their children to an occupational health clinic. They have no bargaining rights. Parents are not in school every day. Schools may not reveal hazards, and there is no system that provides a right to know safeguard.

Certainly, parent/teacher associations and organizations, parent associations, as there are in New York City, are voluntary groups. They simply do not have an institutional history or capacity to deal with extended onsite environmental investigations. It is not a system to protect children.

So we think that fresh air and sunshine are a great idea, and we think that fresh air and sunshine ought to be in schools. It is a back to basics movement to have healthy and high performance schools for our children.

We know that fresh air and good indoor air quality are associated with better productivity for adults. They ought to be associated with better productivity for children. We know that daylighting is, as well.

One of the things I want to talk about very briefly is the terrific kit from EPA, the "Indoor Air Quality Tools for Schools" kit. EPA really is to be commended for getting this out the door and pushing as hard as they have. It came out approximately the same time as the General Accounting Office reports in 1995.

Since that time, while we all know that 14 million children are compelled to be in decaying and polluted schools, the kit, unfortunately, has only reached approximately 1 percent of all schools nationally. This, again, is not a system that protects children. Implementation is elusive.

One of the results of this is that there are more and more children on medications than there ever were before. Asthma medications, as you know, may have side effects, such as tremors, nausea, headache, and anxiety.

On physician orders, some parents have kept their children home, or they have withdrawn them and are voluntarily home schooling them.

We have also had calls, I regret to tell you, from parents who tell us they have seriously ill children, have schools that have ignored physician letters, and also report their schools have threatened to

report them for child neglect, based on the children's long absences from schools.

This is a serious issue with respect to having free appropriate publication education, and an accessible facility, and an accessible educational program.

One of the things I want to mention is the outbreak of school rashes that further illustrates the problem of trying to keep track of both environment and of children.

Because of our clearinghouse, and because of our national network of participating organizations, very early on, we were alerted and had a number of incoming calls about strange rashes breaking out on children.

Included as an attachment to our testimony here is some correspondence that we developed as a national coalition to the Centers for Disease Control. I think our letter arrived at CDC about the same time it decided to conduct an investigation.

But the result was that CDC did, in fact, conduct an investigation, and determined that there were well over 1,000 students in 27 different States, who were affected by this rash outbreak. It, in fact, in our records, started well before September 11th.

CDC issued a preliminary report on the rash outbreak. Part were attributed to unknown causes; to ordinary childhood diseases; and part, to applied chemicals and renovation dust.

So it is hard to tell what is taking up all that time. We have no system to monitor child health. There is no State that tracks or records student illness or injury. It does not exist.

So in times of questions with domestic security, and in times when we do not know what is going on with children, we have no baseline. We do not know what is happening to them in their workplaces.

We also know, through the rash investigation, that there were schools that refused to have an onsite environmental investigation. I think that is a real challenge, both for this Committee and for other committees concerned about the interaction of environment and health, on how to deal with and how to develop some sort of realistic and effective tracking system.

We would like very much to continue the discussion with the Senate, through this Committee and with other committees, because the problems are not simple.

They are cross-jurisdictional issues here, as was raised on the earlier panel. Education needs to be involved very clearly. Environment needs to be involved, very, very clearly, and Health needs to be involved, very clearly.

We would like to see "Healthy and High-Performance Schools" funded. It needs to be funded. It needs to be implemented. It needs to be moved forward.

We would like to see the EPA's schools program established as a clear agency priority. It needs to do more research on indoor air in schools. It needs a good evaluation of "Indoor Air Quality Tools for Schools," to look at toxic exposures and reducing absenteeism. Strengthening EPA's regional office work with State agencies will also be helpful.

We also call your attention, not just to the children's centers for research, but also to the Pediatric Environmental Health Specialty

Units, the PEHSUs, that are in existence. These are clinical centers that will advise other physicians or actually see children, partially funded by EPA.

As I mentioned a little bit earlier, if you are a parent of an affected child, you actually cannot take your child to an occupational health clinic.

But we have found that we have had a good referral relationship with a number of the Pediatric Environmental Health Specialty Units that can, in fact, see children and determine whether or not what they are looking at is a building-related illness. So we would like to see an expansion of that.

We would also like to see EPA develop best practices for schools, not just at a building level, which is where "Tools for Schools" works, at an individual building level, but at a district level, for implementation of policies.

Clearly, the School Environmental Protection Act needs to be passed. We strongly support that as a national coalition. It will put in place pest-proofing of buildings, that will eliminate the need for toxic chemicals, and we sincerely hope that school repairs and construction will be funded. Thank you.

Senator JEFFORDS. Well, thank you.

Now I introduce Mr. Alex Wilson, who is the president of BuildingGreen, Inc., of Brattleboro, VT. Mr. Wilson is here representing the U.S. Green Buildings Council. Please proceed.

STATEMENT OF ALEX WILSON, PRESIDENT, BUILDINGGREEN, INC., REPRESENTING THE U.S. GREEN BUILDINGS COUNCIL

Mr. WILSON. Thank you very much, Senator Jeffords.

I am sure, as you can sympathize, it is hard to leave Vermont this time of year, with the foliage getting started.

Senator JEFFORDS. You deserve a medal, I assure you.

[Laughter.]

Mr. WILSON. It is great to be here, and I thank you for this opportunity to address the Committee, and Senator Clinton.

My name is Alex Wilson. I am president of BuildingGreen, Inc., a small company in Brattleboro, VT, which publishes *Environmental News*, which is a leading national publication on green building issues.

I also serve on the Boards of the U.S. Green Building Council and the Sustainable Buildings Industry Council, both here in Washington, and both are very much involved with efforts to advance the implementation of energy-efficient, environmentally responsible buildings, including schools.

My hope here is to provide a quick overview of high performance schools and their benefits, and then touch on some recommendations as to where the Federal Government could effectively play a role. Greater detail is provided in the written testimony which I am submitting.

So in a sense, I am going to be addressing the good side of the issue; what we can do about the problems that Ms. Barnett and others have raised.

What is a high performance school? Very simply, a high performance school is one that improves the learning environment, while

minimizing environmental impacts, saving energy, and reducing operating costs.

High performance schools rely on an integrated whole buildings approach to design. This is a process in which different members of a design team work together recognizing, for example, that better glazings and energy efficient lighting systems allow us to downsize the air conditioning systems; so spending money more on one place to save money in another.

What are the benefits of high performance schools? The benefits of high performance schools accrue to students, teachers, taxpayers, and the environment. I have outlined eight benefits below.

First would be improved student performance. As Senator Jeffords alluded to earlier, there is growing evidence that a school's physical condition, including its lighting and indoor air quality, have a direct impact on student performance.

In the California study that Senator Jeffords referred to, students in classrooms with the most daylighting progressed more than 20 percent faster on math and verbal tests than students in classrooms with the least daylighting.

Studies like this confirm what teachers, students, parents, and others have known anecdotally for years; that a better facility, one with good acoustics, lighting, and air quality, will enhance learning.

The second benefit would be increased attendance. A high performance school will keep students and teachers healthier, reducing absenteeism. I will not go into further detail on that, given Ms. Barnett's excellent testimony.

A third benefit is increased staff satisfaction. High performance schools are comfortable and healthy places to work. That helps attract and retain quality teachers.

The fourth benefit is reduced operating costs. Schools in the United States spend approximately \$6 billion per year on energy. That is more than they spend on computers and textbooks, combined. High performance schools can save 40 percent, and sometimes we are seeing even 50 percent, on these energy costs.

The fifth benefit is reduced liability exposure. Because high performance schools are healthier, they reduce a school district's risk of lawsuits. Unfortunately, in our society, that is a very significant issue at the local level.

The sixth benefit is reduced environmental impacts. High performance schools use energy and water efficiently. They use durable, non-toxic materials that are high in recycled content. They provide for stormwater infiltration, replenishing groundwater. They minimize waste generation. Many of these schools include renewable energy systems.

The seventh benefit is using the school as a teaching tool. Schools are places of learning, and many of the technologies and techniques used to create high performance schools can also be used as teaching tools.

The Alliance to Save Energy, which Senator Jeffords is Vice Chair of, has played a leading role in this effort, through their Green Schools Program, I think, since 1996.

Finally, the eighth benefit is schools as disaster shelters. Schools often play a role in a community's disaster planning, and high per-

formance schools that incorporate natural daylighting, highly energy efficient envelope systems, and renewable power generation will perform far better during power outages than conventional buildings.

All right, well, what about examples of high performance schools? Are there examples? Yes, more and more high performance schools are being built throughout the country. Thirty-two schools are currently registered with the U.S. Green Building Council's LEED rating program, which is a program recognizing green features in non-residential buildings. But among the thousands of new schools planned over the next few years, only a small percentage are likely to be what we would call high performance.

So this brings me to my recommendations. What can the Federal Government do to turn this around? I have divided this into a number of areas. First would be research needs.

There are a number of research areas that could significantly benefit school design. First of all, we need more studies to help us understand just what the connection is between academic performance and factors like daylighting and indoor air quality.

We need to learn more about basic building science issues; like how to create buildings that are going to avoid mold problems.

We need to develop better HVAC and lighting packages for schools, to minimize the need for expensive customized engineering which, today, with high performance schools, has to happen basically in every classroom of every one of these high performance schools.

We need better daylighting design tools. We need national protocols for quantifying hazardous emissions from building materials.

Next would be education and technology transfer needs. Superb resources on high performance schools have been developed by such groups as EPA, DOE, the Sustainable Buildings Industry Council, and the Collaborative for High Performance Schools in California.

But particularly in smaller States, Federal support is needed to get these resources into the hands of those who need them. That is a key role that the Federal Government could play.

Next would be flow-through support to schools relating to design and construction. Especially in smaller States, schools need funding to pay for key aspects of design and construction. Two priorities are computer energy modeling and commissioning. Commissioning is a process to ensure that a school is actually built and operates as it was intended.

Very often, we are finding a school is completed, and systems do not work as they were designed. It needs tweaking. It needs fine tuning after completion.

A special fund, distributed through State education departments, to support such efforts would be extremely beneficial. I believe that the healthy and high performance schools initiative, the component of the 2001 Education Bill, provides a mechanism for this, and it would be wonderful to see that fully funded.

Next and finally, it would be wonderful to see the Federal Government support a LEED Application Manual for schools. I mentioned the LEED Building Rating Program earlier. This is a program designed for commercial buildings.

The U.S. Green Building Council has been developing specific application manuals to serve specific markets, and schools is one of those that has been identified.

So in summary, schools are an investment in our country's future. High performance schools can better serve our children's academic potential, even while reducing taxpayer costs.

To achieve greater penetration of high performance schools, we need to provide support at key leverage points. Integrated, whole-systems design is the mechanism to do that, and the Federal Government can play an important role.

Thank you, Senator Jeffords and Senator Clinton, for this opportunity to speak to you this morning. I would be very glad to follow up with any of these ideas with Committee staff, as would the U.S. Green Building Council and the Sustainable Buildings Industry Council.

Senator JEFFORDS. Thank you, and thank you for that offer.

Our final witness is Lois Gibbs, who is executive director of the Center for Health, Environment and Justice, based in Falls Church, VA. Please proceed.

**STATEMENT OF LOIS M. GIBBS, EXECUTIVE DIRECTOR,
CENTER FOR HEALTH, ENVIRONMENT AND JUSTICE**

Ms. GIBBS. It is getting pretty there, too.

Thank you for this opportunity to speak with you. The Center for Health, Environment and Justice also coordinates the Child-proofing Our Communities Campaign, which is much of the work in front of you that I am going to testify to, which actually came from members of that campaign.

This is an issue that has concerned me for over 20 years. You are obviously familiar with my involvement at Love Canal, which lead me to be termed, the "Mother of Superfund." But what most people do not know is that my concern at Love Canal began with the 99th Street School, a school that my child was attending on the perimeter of Love Canal, back in 1978.

Children are powerless against many dangers, and they look to adults for this protection. However, decisions that adults are making frequently endanger our Nation's children.

Today, new schools are being built on or near chemically contaminated land, or near industrial facilities with toxic emissions, and there is growing evidence that these chemical exposures diminish our children's health and intellectual abilities.

While laws compel children to attend school, there are astoundingly no guidance or laws in place that compel school districts to locate school buildings on property that will adequately protect the school population from environmental health and safety risks.

California is the only State that has some regulations and an assessment process for building new schools. Consequently, some parents are forced by law to send their children to schools that pose threats to their children's health and their children's ability to learn.

CHEJ, over the past 2 years, has received a number of inquiries from parents who were concerned about an existing school, where there was a high rate of cancer or other diseases; or where they found chemicals in the soil around the campus; or they were con-

cerned about the construction of a new school on top of contaminated sites.

For example, parents in Elmira, NY, told us about their 24 teenage boys who suffer from testicular cancer. They all attend the same school on a piece of contaminated land.

Parents in Tucson, AZ, report that their teenagers, again, attending the same school, were also found to have a high rate of testicular cancer. I mean, think about that. We are talking young boys.

In Marion, OH, high school students there have a high rate of a rare type of leukemia. In Houston, TX, parents were concerned about a new school, serving a largely Latino population, where the property line of the school is less than 1,000 feet from two large chemical plants: Mobil Chemical and Texas Petrochemical.

In Providence, RI, parents have called us, concerned about their new elementary and middle school, which is built on land that was used for illegal dumping, and was used as the city garbage dump for at least 25 years.

Finally, in New Orleans, parents called us, concerned about the safety of their elementary school children, where the school is located on top of a Superfund site. It was designated Superfund after the school had been operating for 3 years.

We began to ask ourselves, how widespread are these situations? To answer that, we looked at the location of public schools in five States, and we overlayed those locations with known State and Federal identified contaminated sites.

This research revealed that 1,196 schools are within a half mile of known toxic waste site, with an estimated population of 620,000 students. Those are reflected in some of those maps that I have brought around here.

Most children walk to school within one mile of the school. So these are sites only within half a mile of their public school.

Based on these findings, we believe that there is a critical need for national laws ensuring that the locations for new schools are safe, and that contaminated property is properly cleaned up.

The Child-proofing Campaign has developed model school siting legislation to promote laws and policies that protect children's health.

This model includes the establishment of a school siting committee; a categorical exclusions for school sites, meaning under no circumstances should a school be built on top of, or within 1,000 feet of a hazardous waste disposal site, a garbage dump, or a site where construction and demolition materials have been disposed of; and a detailed process for evaluating the site, which would include a three tier assessment and remedial approach, which we derived from the California guidance regulations; and finally, screen tools.

We are suggesting as an interim screening tool, the New York State recommended soil clean-up objectives; because they are the most conservative numbers that we have been able to find.

However, guidelines appropriate to children's health are desperately needed for both screening the site and for cleaning up. At this time, the primarily non-technically trained school board and decisionmakers are forced with two very challenging questions. What level of chemicals are protective for young children, school-

age children; and how does the school board pay to clean up historical contamination?

It has been the campaign's experience that the level of clean-up varies widely, from site to site; the determining factor often being the economic status of the particular school.

EPA is best suited to issue such guidelines related to an assessment and a clean-up of these sites. I strongly urge this Committee to give school boards what they need, and mandate EPA to establish such guidelines and standards.

Additionally, without adequate resources, the local school authorities cannot effectively assess or clean up the property to a standard that is protective of children. Therefore, we are advocating the Federal funding of the appropriate agencies to support schools who apply for the assessment, radiation, and construction of a healthy school on otherwise unsafe sites.

We are truly at a critical juncture. If action is not taken immediately, new schools will continue to be built without guidelines to protect children against chemical exposures. Failure to act could place tens of thousands of children at risk of being exposed to toxic chemicals at their place of learning.

Society cannot allow innocent children to be placed in harm's way, due to decisions by local school authorities, who had no scientific or technical guidance or funding to adequately address their local situations.

Thank you.

Senator JEFFORDS. Well, thank you very much; that was very alarming testimony from all of you. I just cannot thank you enough in helping us today to alert this Nation to the serious problems that we have in this area.

Senator Carper, do you have a statement that you would like to make?

Senator CARPER. I do not, but thanks for asking; a warm welcome to our witnesses, thank you.

Senator JEFFORDS. I did not see you there, sorry.

Senator CARPER. I am easy to overlook.

[Laughter.]

Senator CARPER. It has happened for years; guys from small States, you know what it is like.

[Laughter.]

Senator JEFFORDS. Ms. Barnett, how universal is the problem of unhealthy schools; and do other countries experience the same problems?

Ms. BARNETT. That is wonderful question, thank you.

They appear to be fairly universal. They are certainly universal in our country. Every State has stories just like the stories we offered on the record today. It happens all over the place, all the time. But schools are not happy to talk about it. It is a very difficult issue for a lot of people.

In terms of an international import, it does have some international effect. I chaired a school environmental health policy panel for an international conference in Monterey this summer.

What was astounding to me, because we have not worked internationally at all, was the extent to which our own experience was replicated internationally. It was fascinating.

My co-chair on the panel was an occupational health physician from the University of Milan, who was there representing 250,000 people from the European Union in 17 countries, who could have read the testimony that we prepared today.

So, I think the opportunity for EPA to provide leadership is now just leadership for children here, and for children in every building in this country; but also it is an opportunity to provide leadership in some research internationally, as well, on a very difficult topic.

Schools everywhere are very densely occupied indoor spaces, under-maintained, and they have lots of people coming in and out all the time. They are hard to keep clean, hard to keep well designed, hard to keep ventilated. So it is a tough issue for everybody.

Senator JEFFORDS. Last year, a large number of schools experienced rash outbreaks. Why have we not heard of such occurrences more often?

Ms. BARNETT. Well, I do not know why we have not heard about it more often. It may be that it had not occurred more often.

But there is no baseline. We actually do not know what the baseline is on children in schools. We do not know how frequently there are illnesses and injuries. We do not know what types of illnesses and injuries there are. There is no State that collects and reports and records that kind of information. So we really do not know how usual or unusual it was.

Senator JEFFORDS. This is a question for Ms. Gibbs.

What is the single most important thing that the Federal Government can do to ensure green healthy schools?

Ms. GIBBS. I think one of the most important things is to set some guidelines. Right now, there are absolutely no guidelines.

There are some States who have put together some information such as California; who I think has done an extraordinary job. But there are no consistent guidelines.

What happens at these schools is the more economically depressed the area, the worse off the school is, and the more likely the school is going to be located on a dump or near such a facility.

Senator JEFFORDS. You mentioned California is the only State. What is going on? Why have others not pursued this approach?

Ms. GIBBS. It is unbelievable, is it not? I mean, I do not know why. I just find it stunning that no States and the Federal Government have absolutely no laws. You have more laws about building a home, a commercial building, a store, a 7-11. There are more laws governing that in toxics than there are schools.

We, through the campaign, have been working the States of New York, Massachusetts, Ohio, Michigan, and Texas to try and begin some State laws that put some requirements in about the exclusions of not building on a dump; but also how to assess the property, and then how to clean it up.

The other piece of it, of course, is that in order for schools to assess property, that costs money. This Committee probably knows so more than other committees, that it is extraordinarily expensive to do testing.

So the school boards are then put into a position of, do they pay for extensive testing to really determine the danger; or do they save that money to build the school with the resources, to help the

children, technology or otherwise, to be better prepared for the marketplace?

School boards are like this, with very little training, and sometimes they chose the testing, and sometimes they do not.

Senator JEFFORDS. I will sneak a little question in here on one of my pet projects. If the Federal Government funded special education and Title I and Pell Grants to the level that they are supposed to be funded, would that help with getting more green schools?

Ms. GIBBS. I think it would help. I think anytime schools can get Federal funding, especially for those types of programs, it definitely helps. Because it takes the weight off of the school for other things.

Actually, two of my children, since Love Canal, are special education children, and I know what a struggle that is in Timberlane, to be able to get my children the assistance they need. What happens is the special education teachers get lost in the shuffle.

So, I think any time the Federal Government can provide resources to take the burden off the local school district, the better off it is. I will add, again, it is especially in areas where there are children who are economically less better off than others, because they are the most needy of that type of assistance.

Senator JEFFORDS. I will turn to Alex. If you had to pick one of two green technologies as most important for the schools, what would they be?

Mr. WILSON. I think I would probably look at daylighting as a very key priority. That is not only for the productivity and student performance benefits it provides; but also for the money savings it can provide to the school district.

Another strategy would be displacement ventilation. We can design much better ventilation systems for schools, that help get rid of pollutants that might be emitted from clothing, from building materials, from cleaning materials used in the school. So those would be two key technologies that I think need to be looked at, to a much greater extent than they are currently.

We should also look at material choice and basic building science, which is grossly under-supported. There are many fundamental things we do not know about keeping moisture out of buildings.

It is a seemingly very simple strategy, but it is quite complex, in reality. Moisture is the fundamental cause of many of the non-site-specific or hazardous-waste-specific problems in schools.

Senator JEFFORDS. If the Federal Government were to provide some flow-through funding to improve school design, how should that money be targeted; and how much would it cost, on a per-school basis?

Mr. WILSON. Well, I am certainly not an expert on the way funding works. But I would like to see funding go toward State education departments. I could foresee a pool of money that could be used by those departments to provide key support at the design leverage points in schools, to pay particularly for computer modeling, which is a key priority in creating these high performance buildings that we are talking about.

Also, perhaps there could be support for commissioning; that step that happens after the school is completed, but before occupancy. Some studies have shown that 40 percent of commercial buildings

have fundamental problems with the way the heating ventilation/air conditioning systems were installed. You know, often these are problems that can be fixed very simply, if they are examined after construction.

In terms of the cost of these strategies, good computer modeling, of course, depends on the size of the school and the complexity of the school. But we are looking at probably somewhere in the range of $\frac{1}{4}$ of 1 percent of the construction budget, something on that line. So for a \$10 million school, it might be on the order of something like \$20,000 to \$30,000.

For commissioning, there are a number of different estimates as to the cost. I have often heard the figure of $\frac{1}{2}$ percent to $1\frac{1}{2}$ percent of the construction cost. I have also seen much lower estimates of 10 cents to 60 cents per square foot of building.

So again, I think on the range of $\frac{1}{4}$ to $\frac{1}{2}$ percent of the construction budget would probably be, you know, a huge benefit. You could go further with commissioning, but that is certainly a great starting point.

Senator JEFFORDS. Senator Clinton.

Senator CLINTON. Thank you very much, Mr. Chairman, and I particularly want to thank our panel. I do have an opening statement that I will submit for the record. But I want to follow-up on your reference to special education.

We now have 12 million children under the age of 18, who have been identified as suffering from a developmental learning or behavioral disability.

Since 1977, enrollment in special education programs has doubled. State and Federal education departments spend about \$36 billion a year on special education programs.

I am certainly concerned at the increase in the numbers of our children who are being identified as in need of special education. At least, insofar as we know, at this point, research suggests that genetic factors explain around 10 to 20 percent of developmental diseases and disabilities.

But a National Academy of Sciences study suggested that at least 28 percent of developmental disabilities are due to environmental causes. We do not know the causes for most of these, but we certainly do know that pollutants like lead, mercury, pesticides, dioxin, contribute to these problems.

I think it is imperative that we do a much better job in gathering the necessary data on disease incidents and potential environmental causes, in order to begin to understand this rapid increase in our children who are being identified as in need of special education.

So when we undertake the special education reauthorization, and this is really something that Senator Jeffords has been intimately involved in, helping to author the Individuals with Disability Education Act, back in the 1970s, we need to start being honest in trying to figure out what is causing this increase.

Because it is not only enough that we get the Federal Government finally to fulfill the promise that Senator Jeffords extracted all those years ago, to fund 40 percent of special education; but we need to try to prevent and cure and eliminate problems that cause learning disabilities and other kinds of difficulties for our children.

I know that as we go through this, both Senator Jeffords and I are fortunate to sit on the Health, Education, Labor, and Pensions Committee, which will have jurisdiction for reauthorizing IDEA.

And I hope that each of our witnesses on this panel will give us ideas that you might have about what we should do when we reauthorize the special education bill, so that we can try to begin to understand what we need to do better to address children who might have been affected by environmental pollution, exposure to toxins, and other problems that have led to their being identified as in need of special education.

I want to ask Ms. Barnett about a very important study that you were part of. It is called Schools of Ground Zero; Early Lessons Learned in Children's Environmental Health.

I want to hold this up, because I want everybody to see what a tremendous undertaking this was. I think there might even be some of the parents and others that you worked with. It was recently published by the American Public Health Association and the Healthy Schools Network.

Ms. Barnett, can you tell us some of the most critical lessons that learned through this study?

MS. BARNETT. We undertook that. Actually, it has just a very short history, which is, our Board of Directors met in October, shortly after September 11. We had our meeting in New York City. All of this was extremely fresh and extremely painful, particularly for some of our Board members who had met, who had lost colleagues and friends.

We decided that one thing we could do is try to document what was actually happening with children, document what was the first 24 hours, the actual evaluation process itself, and try to document what was then going to be the first 90 days, which we assumed would take people into the re-occupancy of all the seven public schools. So we focused on the public schools.

We look specifically at the experience of children, through the eyes of their parents, and we commissioned journalists, who went to all the PTA meetings, Parent Association meetings, and did extensive interviews.

What was going to be a simple research project developed into a book, and we were delighted to be able to do this with the American Public Health Association.

There is one fundamental lesson here which is, there is no system to protect children. Buildings were re-occupied. People believed that they were clean at the time. They turned out not to be. There are a lot of reasons why that might happen.

One of the most interesting events was looking at New York City and some of the health specialists, who were giving broad advice to the community of Lower Manhattan about how to keep your great indoors clean. The advice was, take your shoes off outside and keep the windows closed, and there were a number of sort of protocols people should go through.

The reality is that schools cannot do any of those things to stay clean. The best-intentioned advice out of the health system could not be applied to the school setting, because people truly do not understand school facilities and the educational system.

There are big differences between offices and schools. It is not just density of occupancy. One of the big differences is that once a school is back in session and commissioned, they do not close down again.

So students who were ill on the job do not take their work home, and work at home for the afternoon, as a lot of people in Lower Manhattan did; but they are onsite. If they miss school, they miss school. If they miss a test, they miss it. They cannot send in a substitute.

So, schools cannot really be treated like any other kind of institutional setting, like commercial office buildings. They are very different places.

Parent associations, though, I mentioned in my testimony—and this is universal, and it is not unique to Ground Zero—parent associations simply are never prepared. I am sure that there is not a single parent association president in Lower Manhattan who would say that they ever anticipated, along with the rest of the world, what the schools needed to go through and what their roles would become, as volunteer association presidents.

All of us who have done duty as PTA people will know how many phone calls it takes to get a meeting together. It takes a long time and a lot of hard work. But there is no system to rely upon. There is no independent agency at the Federal, State, or local level, which is specifically charged with the ability just to protect children.

Senator CLINTON. You know, one of the items that we introduced in the Homeland Security Bill that we are still debating is an amendment to have an office within that department, charged with the responsibility of looking after children. Because that has been our experience in New York; that that is an unmet need of great urgency, and we hope we will be able to achieve that.

And I want to thank Mr. Wilson for coming with his expertise and experience. I sent out a brochure last year to our schools in New York, "Smart Schools Save Energy." That is the other part of the equation. They not only keep you healthy, if they are done the right way, and make you more productive, but they also save energy; and I look forward to getting more information from you.

Finally, I just wanted to ask Ms. Gibbs, in your testimony, one of your recommendations is the establishment of school siting committees within school districts or local schools boards.

Can you elaborate on this, and are there examples of such siting committees, or anything similar already in existence in any part of the country?

I know that we have tried health and safety committees in New York, and there have been some issues raised about those. So could you cover that for us, to give us a little more information.

Ms. GIBBS. What we were suggesting on the siting committee, most school sitings, what happens is, a little notice gets posted in the newspaper. New schools have feeder schools, or students who come from other schools.

So the siting committee includes those parents who have children who are coming from another school, to be notified of the new school siting committee. Along with that would be people who had expertise in things such as Mr. Wilson and Claire Barnett, and

local elected officials. So they would be the local people who are really going to move forward on the build of the school.

To my knowledge, the only siting committees for schools that exists now are pretty much locally controlled. They vary from place to place. Essentially what they are is just a notification in the newspaper, where parents who do care, or have noticed it, will come out to the meetings. But there is no sort of firm requirement that feeder schools and these other folks come and sit down at the table and begin to deal with this issue.

I think because siting schools are very questionable, in reference to testing, in reference to how to build it, whether to put carpets in or not, I mean, it really goes beyond health and safety, and I think what was done in New York is extraordinary. I know Claire and other folks have had a major role in that.

But it goes beyond that. It is thinking the whole school process through, from the dirt that it would be set on, to the type of materials that would be used inside.

And the advantage of the siting committee, which would include parents, is that there are very hard decisions to be made, every step of the way. We cannot build the ideal school in every community on ideal, perfect land.

So when those choices are made, whether we use material "x" or material "y" or whether we clean up a site and dig 10 feet down before we put the footers in, or 5 feet down; that parents should be part of that decisionmaking process; that they should not be the recipients of looking over the final decisions and either saying yea or nay. Because those are critical to their children and critical to the future of their children and their community.

Senator CLINTON. Thank you, Mr. Chairman.

Senator JEFFORDS. Well, thank you all for very, very excellent testimony. I cannot tell you how proud I am of you and what you are doing.

Yet, it raises the tremendous need we have in this Nation to follow through with the knowledge that you have given us, to make sure that our schools are as healthy as they can be, and that we maximize the opportunities for our young people.

So thank you very, very much for your testimony.

Ms. GIBBS. Thank you, Senator.

[Whereupon, at 11:47 a.m., the hearing was adjourned, to reconvene at the call of the chair.]

[Additional statements submitted for the record follow:]

STATEMENT OF E. RAMONA TROVATO, DEPUTY ASSISTANT ADMINISTRATOR, OFFICE OF ENVIRONMENTAL INFORMATION, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. Chairman and members of the committee, I am Ramona Trovato, Deputy Assistant Administrator for EPA's Office of Environmental Information (OEI) and former Director of EPA's Office of Children's Health Protection (OCHP). I am pleased to be here on behalf of Administrator Whitman to discuss EPA's efforts to ensure that our schools are safe and healthy places for our children to learn. Administrator Whitman is a strong advocate for children and has been committed to improving and promoting EPA's programs to address environmental hazards in schools from the day she arrived. I am particularly happy to be here today, because today marks the first day of Children's Health Month.

Protecting our children's health is a priority of this Administration and of EPA. Children are our most precious assets, and they can be more vulnerable to many environmental contaminants than adults. Children's bodies are still developing, and they may be exposed to more environmental contaminants than adults, both because

they eat, drink, and breathe more per pound of body weight, and because their behaviors—like putting things in their mouths and playing on and close to the floor—may bring them in greater contact with contaminants than typical adult behaviors. Throughout the month of October, a collaborative effort of 17 Federal departments, agencies, and White House Offices will celebrate Children's Health Month by making a special effort to raise awareness of the importance of protecting our children from environmental health and safety risks and by publicizing tips throughout the month for parents and other care providers to follow to keep our children healthy and safe. I encourage you to visit a special inter-agency Web site (www.childrenshealth.gov) and help to publicize the practical steps that people can take during this month—and throughout the year—to protect kids.

Every time I hear the statistics—15 million people in America suffer from asthma, one-third of whom are children under the age of 18—I am reminded of what a gift it is to breathe freely. Asthma is the leading chronic illness in children and the cause of 14 million missed school days each year. Allergens, including those from mold, cockroaches, dust mites, and animal dander, are all commonly found in indoor environments, including schools, and are known to trigger asthma attacks. Outdoor air pollution from pollutants such as particulate matter and ozone also induce asthma episodes.

Hundreds of thousands of children living in the United States still have blood lead levels high enough to impair their ability to think, concentrate, and learn. Lead poisoning also lowers IQ and increases behavioral problems. Although lead paint hazards in older homes are the biggest concern because of exposures to very young children, lead paint is still found in many older schools, and lead can be found in the drinking water of both old and new schools.

Children in our nation's schools may also be exposed to many other contaminants, including chemicals in cleaning products and art supplies, materials and furnishings used in school buildings, fumes from idling school buses, pesticides, radon and potentially even to mishandled sources of mercury and asbestos. And the list goes on.

Unfortunately, in far too many cases, because of severe past budget shortfalls, our schools are old and inadequately maintained, leading to a host of environmental problems that can have dramatic impacts on children, staff, learning and the fiscal bottom line. Both the General Accounting Office and the National Center for Education Statistics of the Department of Education have documented the poor physical condition of many of our older school facilities.

More than 53 million elementary and secondary students attend approximately 112,000 public and private schools in the United States. Along with approximately 3 million teachers and staff, this represents about 20 percent of the U.S. population. The average child spends about 1,300 hours in a school building each year; teachers and other employees spend even longer periods.

According to the National Center for Education Statistics report, *The Condition of America's Public School Facilities: 2000*, about one-quarter of schools report that they need extensive repair or replacement of one or more buildings. Approximately 11 million students attend these schools. About 40 percent of schools report at least one "unsatisfactory environmental condition" such as poor ventilation, heating or lighting problems, or poor physical security. According to a 1996 study by the General Accounting Office, *America's Schools Report Differing Conditions*, these unsatisfactory environmental conditions are most often reported in urban schools, schools with high minority student enrollment, and schools with a high percentage of low income students. In some instances, low income and racial/ethnic minorities have increased exposure to environmental hazards and suffer disproportionately from environmental exposures. For example, the Department of Health and Human Services has estimated that African American children are three times more likely than white children to be hospitalized for asthma and asthma-related conditions; these children are four to six times more likely to die from asthma. These disparities are often at least partially attributable to differences in health care. Minority children also have significantly higher rates of elevated blood lead levels.

To date, school facility conditions have not been widely perceived as playing a critical role in the education process, largely due to the fact that research into the complex relationship between aspects of the physical environment, including environmental factors, and the well-being, health, productivity, and academic performance of students is only now emerging. In fact, the Lawrence Berkeley National Laboratory has recently conducted a review of the scientific literature in this area at EPA's request, and EPA is preparing a summary of the existing science that may associate indoor air quality factors in schools and other buildings with health, productivity, and performance of children. EPA is also supporting research in this area. Our Science to Achieve Results (STAR) extramural research grant program already supports a limited amount of research on school environments. In 1997, the program

provided funding to the University of Minnesota for a school-based study of complex environmental exposures in children at the University of Minnesota. This study used outdoor, in-home, in-school, personal, and human tissue monitoring to quantify exposures among children in two low-income, racially diverse schools in Minneapolis. The Agency continues to explore research related to children's health and the school environment.

Despite the emerging nature of research into the relationship between environmental factors and learning, if a child suffers an asthma attack in class or is not in school because of asthma; if the school is closed because of an environmental health or safety episode; or if the ventilation system is providing little or no fresh air, that child may not be learning up to his or her full potential.

Many schools are being temporarily evacuated or permanently closed due to environmental problems, making the difficult task of educators even more challenging. Moisture problems in schools are known to contribute to both mold and pest problems that may directly affect allergic or sensitive individuals and which can lead to increased application of pesticides. In one case, an elementary school in Fairfield, Connecticut was permanently closed after efforts to fix persistent mold and moisture problems over a period of several years were unsuccessful. The school closure will cost the local school district an estimated \$21 million to replace the school in addition to the costs to demolish the existing structure. The chief of allergy and immunology at the nearby medical center who treated many of the students and teachers over the years estimated that the building impacted the health of up to 40 percent of students and staff.

Funding for school construction, renovation and repair, raised largely through State and local bond issues, has increased significantly over the past several years, suggesting that the general trend for school improvements is favorable. Nevertheless many schools continue to provide less-than-ideal conditions to facilitate learning, and many may pose unnecessary risks to the health of children, staff and visitors.

The public becomes aware of new environmental challenges for schools on a regular basis. Siting of schools on or near contaminated sites, exposures of children to outdoor sources such as diesel bus exhaust, the increasing reliance on portable—or relocatable—classrooms, and the rapidly growing issue of mold contamination all suggest the need for the Federal Government to provide appropriate guidance and technical assistance to States and communities to address environmental health issues in schools. One excellent resource is the National Clearinghouse for Educational Facilities, funded by the U.S. Department of Education.

Within EPA, we have been working very hard for the past several years to help schools address environmental issues. While there is no known cure for asthma, asthma attacks can be prevented by reducing exposure to environmental triggers and by ensuring that all children receive appropriate medical care. EPA is a committed Federal partner in the battle against asthma. Because we believe that one asthma attack is too many, EPA is working to reduce asthma triggers in both outdoor and indoor air.

In February, the President announced the Clear Skies Initiative, which will dramatically cut air pollution by nitrogen oxides, sulfur dioxide, and mercury by 70 percent, using a mandatory, market-based approach. Clear Skies will help to prevent asthma attacks in children. Clear Skies will also help to prevent thousands of premature deaths in the U.S. population.

But Clear Skies is just one part of our effort to make America's air cleaner. We need to make sure that the buses that take our children to school aren't causing them to miss school. President Bush recently approved an EPA rule to reduce pollution from diesel buses and trucks and to require cleaner diesel fuel that will reduce the harmful pollutants from diesel engines by more than 90 percent over today's engines.

EPA has also been leading the charge to help schools address indoor air quality (IAQ) problems through its widely acclaimed Indoor Air Quality Tools for Schools program. IAQ Tools for Schools provides an effective framework as well as practical tools to help schools prevent and solve all kinds of environmental problems affecting indoor air quality in schools. More than 10,000 schools are using the program, and major school districts around the country—including New York City Schools, Dallas, Brevard County, Philadelphia and LA Unified School District—are committed to using the IAQ Tools for Schools as part of their health and safety programs.

We have dozens of anecdotal examples of schools and school districts for which the IAQ Tools for Schools program has provided demonstrable benefits, including reducing asthma related nurse visits and missed school days. We recognize, however, that we need better tools to document and measure the effectiveness of the IAQ Tools for Schools program. One initial effort is a survey we conducted this past sum-

mer that will help us better quantify the reductions in IAQ-related complaints, in absenteeism, and in costs which many schools are reporting as they implement the program.

EPA continues to develop new IAQ tools for schools. The Agency has released specific guidance to help schools identify and fix mold and moisture problems and is working closely with other Federal agencies—particularly CDC—to help ensure that schools, the public and others receive the most accurate and scientifically sound information on mold related health effects and remediation techniques.

By the end of the year, EPA will also release new Web-based guidance devoted to school design, construction and renovation issues titled Indoor Air Quality Design Tools for Schools. This guidance for *new* and renovated schools will complement EPA's IAQ Tools for Schools program, which aims to help existing schools prevent and solve indoor air quality problems. The new IAQ Design Tools for Schools guidance will encourage schools to make indoor air quality goals part of the school planning and design process. It also discusses factors to consider in the siting of school facilities, stresses the importance of building commissioning, and provides guidance on a host of other issues related to the indoor environment. The guidance will draw from EPA expertise as well as from some excellent resources that have emerged from State and private sector initiatives such as the California Collaborative for High Performance Schools and the US Green Building Council's LEED (Leadership in Energy and Environmental Design) Green Building Rating System, among many others. The draft IAQ Design Tools for Schools guidance was widely available this summer for public review, and we are now integrating comments from a broad spectrum of interests.

I know that this committee is particularly interested in the issue of school siting. However, as you know, selection of sites on which to build new schools is largely a local decision and a local issue. Many factors related to the availability and cost of land, community values, and a host of other factors come into play. Unfortunately, in a number of cases and for a variety of reasons, schools are sometimes being built on or close to existing sources of air, water, and/or soil contamination. While the Federal Government does not play a direct role in these decisions, we can help communities make wise decisions by providing better information of potential environmental risks and ways to reduce those risks. For example, the draft IAQ Design Tools for Schools guidance recommends early involvement in the siting process by the community, a thorough Phase I environmental site assessment using ASTM guidelines before the site is acquired, and a more detailed site assessment and, if needed, clean-up plan, before deciding to build. There are also a number of tools available to assist communities, including EPA's Enviro Facts Data Warehouse (<http://www.epa.gov/enviro/>), which provides a wealth of resources to help the public access environmental information about their community.

The IAQ Design Tools for Schools guidance also strongly encourages school districts to embrace the concept of designing and building High Performance Schools. High Performance Schools are simply schools in which a wide range of issues associated with site planning, energy use, indoor air quality, day-lighting, acoustics and other building systems are considered as a whole building integrated design that can save energy, natural resources and money. These concepts are being demonstrated as cost-effective in a number of State, local and private sector initiatives around the country. Energy efficient design can result in reduced construction costs as well as reduced operating costs. Even in cases where construction costs are higher, energy savings can pay for additional up-front costs very quickly, sometimes in less than a year. And this doesn't include the potential benefits of improved health, productivity and performance.

Another of EPA's priorities is protecting children from unnecessary exposure to pesticides that are used in and around schools to control pests. EPA is encouraging school officials to adopt Integrated Pest Management (IPM) practices to reduce children's exposure to pesticides. EPA is helping schools understand and implement IPM through the distribution of printed publications, awarding grants to start IPM programs, offering workshops and courses, and providing guidance and assistance through the Tools for Schools Program, as well as partnerships with Universities and national associations. EPA has funded two technical resource centers to promote IPM in schools and day care centers, by providing tools, training and technical support to start IPM programs. The Centers also provide support to State efforts and foster sharing of IPM resources nationwide.

EPA has also recently published a brochure on Protecting Children in Schools from Pests and Pesticides. Over 100,000 copies have already been distributed to schools around the country. The brochure is also available on EPA's Web site at www.epa.gov/pesticides/ipm.

EPA has a wealth of other information and programs to assist schools. The SunWise School Program is an environmental and health education program that aims to teach children and their caregivers how to protect themselves from over-exposure to the sun's harmful ultraviolet (UV) radiation. SunWise partner schools sponsor classroom, school, and community activities that raise children's awareness of stratospheric ozone depletion, UV radiation, and simple sun safety practices, that can ultimately lead to sustained sun-safe behaviors. WasteWise is a free, voluntary EPA program through which organizations eliminate costly municipal solid waste, benefiting their bottom line and the environment. EPA's Water Alliances for Voluntary Efficiency (WAVE) program is a voluntary partnership with institutions such as schools and commercial businesses to prevent pollution and to reduce the demand for and to promote the efficient use of water and energy resources. The Buy Clean pilot program is an EPA initiative to partner with schools and others to promote the purchase of products and services for a healthy indoor environment for schools. EPA's EnergyStar for Schools program is helping schools conserve energy through the use of benchmarking and other tools. Our EnergyStar partnership with the Department of Energy has been a tremendous success. EPA has also recently created a Green Buildings Web Portal to help the public find green building resources throughout EPA.

EPA is very aware of the resource and other constraints under which many schools and school districts labor, and we recognize the importance of providing not just more and better guidance, but better coordinated and integrated programs that will make the job of addressing environmental health issues easier for schools, or at the very least, more efficient. Our goal is to make our environmental programs directly support schools in achieving their primary mission of educating children.

To achieve this, EPA programs emphasize partnerships with those who have the direct responsibility for educating our children and all of the constituencies that are part of the educational process. This includes relationships with individual schools, school districts, and organizations representing school administrators, school nurses, teachers, facility planners and managers, architects, engineers, parents, and even kids. We partner with other Federal agencies, with States, tribes, and with communities to assist schools in any way we can.

We are also working within EPA to better coordinate and integrate existing programs. Toward that end I am pleased to be able to report to you today that just a week ago we inaugurated a new Healthy School Environments Web Portal to provide one-stop access to EPA resources for schools, as well as to help school administrators, facility managers, design engineers, architects, health professionals, parents, teachers, staff and students find helpful resources from other Federal agencies, States, communities and non-governmental organizations.

We are looking for additional opportunities to streamline EPA programs for schools and make them more accessible and more helpful. We recently received a number of recommendations regarding EPA's school programs from the EPA's Children's Health Protection Advisory Committee. These recommendations are consistent with our efforts to improve the guidance available to schools and better coordinate EPA programs.

We believe it is critically important for Federal agencies to work together and in close collaboration to coordinate and leverage existing Federal programs and resources impacting children's health in schools. The President's Task Force on Environmental Health Risks and Safety Risks to Children, co-chaired by Administrator Whitman and Secretary Thompson, has proven to be an effective forum to facilitate increased coordination and collaboration within the Federal community on a variety of issues, including asthma, lead, unintentional injuries, childhood cancer, and now schools. The Task Force has identified school environmental health as a priority and established an interagency Schools Workgroup to identify opportunities for better coordinating Federal efforts in this area. The Schools Workgroup is co-chaired by EPA, the Department of Education and the Department of Health and Human Services, and includes representatives from other Federal agencies involved in school health issues, such as the Department of Energy, the Department of Agriculture, and the Department of Labor, among others.

The President's Task Force Schools Workgroup is currently developing an inventory of Federal programs related to school environmental health. The primary goal of the inventory is to inform the development of a strategic plan that will provide recommendations for increasing the effectiveness of Federal school environmental health programs. The inventory will also be incorporated into a publicly accessible electronic data base of school environmental health programs and activities.

The creation of the workgroup has already substantially improved coordination and cooperation within the Federal community in addressing school environmental health issues. For example, EPA and CDC have offered their assistance and are pro-

viding information to the Department of Education to help them scope the study of Unhealthy School Buildings mandated by the No Child Left Behind Act. EPA is also becoming an active participant in the National Coordinating Committee on School Health, which is sponsored by DHHS, the Department of Education and the Department of Agriculture and is comprised of many of the non-governmental organizations interested in school health issues.

In conclusion, EPA is committed to working within the Federal community, with States and tribes, local governments and communities, as well as with public and private non-governmental organizations to promote children's health in our nation's schools.

Thank you for the opportunity to testify today. I look forward to working with you to make our schools the healthiest possible environments in which to learn as well as to work.

I will be glad to respond to any questions you may have.

STATEMENT OF CLAIRE BARNETT, EXECUTIVE DIRECTOR, HEALTHY SCHOOLS NETWORK, ALBANY, NY

Good morning. Thank you Senator Jeffords, Senator Smith, and other members of the U.S. Senate's Environment and Public Works Committee for holding this historic hearing on the greening of our children's workplaces. There are several questions I hope you will focus on today.

- What do we know about environmental hazards in schools?
- What do we know about how these affect child health and learning?
- What systems are in place to ensure that the opportunities to protect child health and learning and to protect the environment are accessible and implemented?
- What roles should US EPA play in improving school facilities and child health and learning?

The questions are not simple: effective Federal responses to the multiple environment and environmental health questions facing all children and their schools requires integrating the expertise and efforts of several disciplines and agencies at the Federal level and within the States.

My name is Claire L. Barnett. My husband and I moved from Westport-on-Lake-Champlain, NY to Saratoga Springs, NY where we now reside a few years ago. I am Executive Director of Healthy Schools Network, Inc., a national environmental health research, information, and advocacy organization; a former PTO President from upstate New York; the parent of a health-impaired child once in special education; and today, the representative the parents of 50 million children and the 5 million school personnel—such as those with me here today, Joellen Lawson (CT), Jenna Orkin, (NY), Veronica Carella (MD), Grayling and Carol (TN), Bill and Judy Sazonski and their son Will (CT), and Robin Starinieri (VA) whose lives have been impacted by the poor conditions of schools and the lack of any comprehensive system to protect children and adults from indoor environmental hazards at school.

I coordinate the national ad hoc Coalition for Healthier Schools is comprised of over 75 national, State, and local parent, public health, environment, and education groups and is dedicated to assuring that all children and personnel have schools that are environmentally healthy. Several representatives of organizations in the Coalition are here today whom I wish to recognize: American Public Health Association, Beyond Pesticides, Children's Environmental Health Network, National Education Association, and American Lung Association. The Coalition helped secure \$1.2 billion in Federal funds for school repairs in the fall of 2000 and successfully campaigned last year for the "Healthy and High Performance Schools" provisions now in the "No Child Left Behind Act of 2001".

We have also inspired and helped organize countless local healthy schools groups and large coalitions in several States. It is through this rapidly growing network of concerned groups and individuals that we picked up on the outbreak of school rashes last year and with national partners asked the Federal Centers for Disease Control/National Center for Environmental Health to launch an investigation and to report to Congress (correspondence attached).

Applying our skills in New York State, Healthy Schools Network recently completed a 2-year grant that funded intensive outreach to 225 low-income schools on greening existing schools, including healthier cleaning and pest control, Indoor Air Quality (IAQ) protocols, and health & safety committees that are required under State regulations. After the World Trade Center attacks, we provided extensive help to the communities and Parent Associations of the seven public Ground Zero Schools as they struggled to find ways to protect children at school from environmental haz-

ards no one could have imagined. Our commissioned research report on their experience, *Schools of Ground Zero: Early Lessons Learned in Children's Environmental Health*, is now a book co-published with the American Public Health Association that I place on the record here.

The lesson from all of our work and the book: “. . . N is for No System to Protect Children.”

CHILDREN, SCHOOLS, AND ENVIRONMENT

Americans spend 85–90 percent of their time indoors. For the 55 million children and adults in 115,000 schools today, Tuesday, October 1, 2002, the first day of Child Health Month, they know that schools are more densely occupied and less well maintained than most commercial offices. In the US General Accounting Office study in the mid 1990s, it was reported that over 14 million children were in schools that threatened their health. Environmental factors included indoor air pollution, lighting and plumbing deficiencies, and ventilation problems. The American Society of Civil Engineers (table attached) reports that our schools are in worse condition than any other infrastructure including prisons. While enrollments have grown, schools have decayed and renovations and new construction have not kept pace; meanwhile, schools everywhere are enrolling more and more children with special needs: asthma, attention deficit, autism, severe allergies, learning disabilities. Seventeen percent of children under 18 have been diagnosed with one or more developmental disabilities. These disabilities include Attention Deficit-Hyperactivity Disorder (ADHD) and autism and are the result of complex interactions among genetic, environmental and societal factors that impact children during vulnerable periods of development. These children especially do not thrive in the polluted indoors.

As the Federal Executive Order on child environmental health reauthorized by President Bush reaffirms, children are more vulnerable to environmental hazards than adults. Our challenge is how do we create greener buildings for children—from existing building, and with renovations and all-new buildings?

WHAT DO WE KNOW ABOUT ENVIRONMENTAL HAZARDS AT SCHOOL AND THE EFFECTS ON CHILD HEALTH AND LEARNING?

A is for asthma and air quality

Children are especially susceptible to air pollutants. Children have increased oxygen needs compared to adults, they breathe more rapidly and, therefore, inhale more pollutants per pound of body weight than adults. They often spend more time engaged in vigorous outdoor activities than adults.

- Asthma is the leading cause of school absenteeism due to a chronic illness. The U.S. Environmental Protection Agency estimated that American children lost 17 million school days in 1997 due to the disease, and that parents lost 5 million work days in order to care for their children with asthma-related illness. Nearly 1 in 13 school-age children has asthma.

- Major indoor triggers of asthma attacks include irritants such as commercial products (paints, cleaning agents, pesticides, perfumes), building components (sealants, plastics, adhesives, insulation materials), animal and insect allergens, environmental tobacco smoke, and molds. Many of these triggers can be found in schools.

B is for bugs and bioaerosols

Schools that are poorly designed or constructed, or in poor condition, or that have inadequate maintenance, inadequate food storage or garbage and recycling areas, will be subject to pest infestations. Pests like what we like: food, water, and safe place to nest. It is better for the building, healthier for occupants, and cheaper to keep pests out of schools than to continuously apply toxic pesticides. According to *Beyond Pesticides*, to protect children from unsafe, unhealthy practices, more than thirty States have placed limits on school pesticide uses. Pest-proofing of a facility during renovations or repairs is cost effective step to promoting an environmentally healthy school.

- Information about on the amount of pesticides used in the nation's 110,000 public schools is not available. The Federal Government does not collect such data, and, as of 1999, only two States collected data on pesticide use in a manner that allows for identifying use in school facilities. From 1993 through 1996, about 2,300 pesticide-related exposures involving individuals at schools were reported, according to the American Association of Poison Control Centers (although these data are not believed to be complete).

Bioaerosols, specifically, molds in schools are a new “hot” issue but hardly a new issue historically. Molds are everywhere, indoors and out. There is no such thing

as a mold-free environment. There are thousands of different kinds of molds; different individuals may react differently, and some not at all. Testing for molds is unreliable, and since most are capable of causing illness, testing is more beneficial to the vendors than to schools. The message is prevention is cheaper than remediation: reduce humidity, stop leaks, respond promptly to spills and flooding, and take health complaints seriously the first time.

C is for children and chemicals

Chemical toxicants in the classroom, on the playground, in the science lab, or in other school facilities can lead to health risks and adverse learning conditions. They can affect many different body systems and impact health, learning, productivity, and self esteem.

One very effective way to improve indoor environments is to stay current on repairs and to use less-hazardous, or environmentally preferable purchasing (EPP) to buy products for cleaning and repair work. EPP applied to *custodial product purchasing* can result in a zero-cost, positive environmental change. The basic steps to healthier cleaning include keeping dirt and grime out of the building, then by consulting the product labels and Material Safety Data Sheets, determining which products have the least hazardous properties.

Other than *lead, asbestos and radon*, the Federal Government has not instituted requirements or guidelines that would protect children from the same chemical exposures that require employee notification and other worker protections.

Schools are places where children and elemental mercury may come together via thermometers and barometers, in laboratory courses or “show-and-tell.” Mercury can also be released through broken fluorescent light tubes or thermostats.

- Mercury is a potent neurotoxicant and children are particularly susceptible to mercury’s dangers. Mercury interferes with brain development and more easily passes into the brains of fetuses and young children than into the brains of adults.
- Mercury-containing products or spills must be properly handled. Even small mercury spills require specialists. Improper clean-up of a mercury release, such as vacuuming up the mercury from a broken thermometer, will spread the mercury into the air.

Other *sources of chemicals* in schools will include science laboratories, vocational education classrooms, art rooms, copy shops, computer rooms, and custodial storage areas. There is no system that attempts to assess the types of chemicals used in schools, including pesticides. Federal Executive Order 13101 on Environmentally Preferable Purchasing has not been systematically extended to schools to assist them with setting purchasing specifications that will drive out toxic products that may contribute to employee injury, storage problems, disposal problems, air pollution, and student illness or health risks. The Agency for Toxic Substances and Disease Registry studied *evacuations from educational facilities, often caused by chemical spills or releases*, and found—not surprisingly—that the evacuees and victims from schools are younger and more numerous than those from other institutional settings. The most common substances involved were mercury, then tearing agents, hydrochloric acid, chlorine, ethylene glycol, and formaldehyde. There were no estimates of the costs to health, learning, or school administration.

Lead comes with old infrastructure and will be found in paint dust and chips, window sills, the grounds next to an old building, grounds near highways and bridges, and in water. Lead is a potent neurotoxin. Exposure to lead can cause a variety of health effects, including delays in normal physical and mental development in children, deficits in attention span, hearing, and learning disabilities of children, as well as problems with impulsivity and aggression. Long-term effects can include stroke, kidney disease, and cancer. Los Angeles Unified SD flags old classrooms for high priority clean-ups that have flaking paint or paint chips on the floors. New York State requires that school areas to be disturbed during renovation be tested for lead and abated.

- According to a report on the condition of the nation’s school facilities by the U.S. General Accounting Office, schools built before 1980 were painted with lead paint.

- Children may also be exposed to lead through drinking water that has elevated concentrations from lead plumbing materials. Lead contamination in drinking water occurs from corrosion of lead pipes, lead soldered plumbing and storage tanks and lead-containing plumbing fixtures, and it cannot be directly detected or removed by the water system.

- Some support was provided to schools through the Lead Contamination Control Act of 1988 to identify and correct lead-in-drinking-water problems at schools, especially water coolers with lead-lined tanks.

- Rifle ranges at school are another potential source of lead contamination according to research under wraps at the NYS Department of Health (HSN).

N is for no system to protect children.

Twenty-six States have adopted OSHA for public employees, and thus these standards may well protect employees from environmental hazards at school. Although students may indirectly benefit from the Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) activities that cover school employees, OSHA and NIOSH have no jurisdiction for investigating the health impact of exposure to students.

Parents of the Schools of Ground Zero learned this the hard way, as did the parents here with me today. Employees may call in NIOSH to evaluate workplace conditions. None has ever evaluated students who outnumber adults in school by an average of 10 or more to one. Two studies on employees of school in Lower Manhattan found health effects from indoor pollutants 6 months after the World Trade Center attacks. No similar studies are underway on the 3,000 students who returned to their "workplace" in early October.

Not one of the workplace standards have been set to protect children who are compelled to be in school, and none can be invoked by children or their parents. Parents cannot take their children to an occupational health clinic; they have no bargaining rights; they are not in school every day; schools may not reveal hazards and they have no system that provides a right to know; PTA's and PTO's are voluntary groups have no institutional history or capacity to conduct onsite environmental health or workplace inspections.

Numerous studies conclude that there is an explicit relationship between the physical characteristics of school buildings and educational outcomes. To this end, research shows us that better quality buildings produce better student results on standardized tests. In its briefings, for example, the Rebuild America's Schools Coalition points out:

- Four recent studies found higher test scores for students learning in better buildings and lower scores for students learning in substandard buildings. One of the more recent of these studies showed a difference in student test scores ranging from 5 to 17 percentile points.
- Another study in DC Public Schools showed that students in school buildings in poor condition scored 11 percent below students in buildings that were in excellent condition on standardized achievement tests.

BACK TO BASICS: FRESH AIR & SUNSHINE

Healthy and High Performance Schools

Greener buildings are a return to "the basics" of fresh air and sunshine in schools: fund and implement the Healthy and High Performance Schools to help address the environmental needs of decayed schools. It is set up to help schools with design, engineering, and materials selection during major renovations, financed by State agencies. The opportunity to merge national environmental and building sciences information and technical assistance with State energy, education, and environment programs, is unique, timely, and necessary. Volunteer local school boards simply are not equipped to do this alone.

The U.S. Department of Energy's studies on schools and findings that schools could save 25 percent or \$1.5 billion in energy with modest improvements. Other organizations have found school saving up to 50 percent on energy with new equipment and human behavior changes. Daylighting will yield higher test scores and save energy. We also refer you to the excellent green design guidelines for public buildings and schools by the New York City Department of Design and Construction which offers assistance on materials selections.

While there is Federal legislation and regulatory authority at US EPA on outdoor air, and studies and activities around indoor air, there are virtually no laws or enforceable regulations on indoor air quality (IAQ). Yet air pollution is air pollution indoors or out. Priority research needs for the field of adult workers was just published (Am J Public Health) that outlined an extensive NIOSH/National Occupational Research Agenda committee process. *The process is not established to consider children.* In fact no State has a system to collect or report student illness or injury, or to establish standards for them, so improving on research means starting from square one. There was no baseline data on children's illnesses during the recent school rash outbreak.

The New London, TX School Disaster.—On March 18, 1937 a gas explosion killed nearly 300 students, teachers, and visitors. The investigation revealed a litany of false savings, negligence in the design, installation, and maintenance of the heating system, and weakness in ventilation. Only one of the many recommendations were ever put in place—the addition of an odorant to natural gas.

Worse, for the parents of affected children and for school personnel, no school can prove it has acceptable indoor air by producing a test result. Indeed some research suggests that human sensors (the building occupants) are more sensitive than testing equipment and provide continuous onsite feed-back (see Indoor Air 2002 bibliography contributed by researchers at Lawrence Berkeley National Laboratories/Indoor Air Sciences). Indoor air measures can be expensive and must be done under actual operating conditions, with the school fully loaded. Contaminants present can include asbestos, lead, mold spores, pet danders, volatile organic compounds, fumes from uncontrolled renovation projects and cleaning products, instructional supplies, pest/pesticide and their residues, foods, garbage, or the not-so-subtle scents of middle-schoolers in an overheated building. There are some standards for individual contaminants of indoor air set for adult occupational exposures; California has set comprehensive standards for VOC's indoors.

U.S. EPA/Indoor Environments Division (IED) is to be commended for having a strong, well recognized, dedicated, voluntary program for schools, the "IAQ Tools for Schools" (TfS) program. In addition to setting quotas for the regional offices and giving mini-grant to schools to spur implementation, EPA also developed educational materials, such as "School Air Quality and Student Performance" that indicates even healthy adults placed in a polluted indoor environment—and without having health complaints—will experience a 3–7 percent decline in speed and accuracy in keyboarding. *There are no such studies on children, although I am sure the committee would unanimously agree that every school principal wants a 3–7 percent gain in standardized test scores.*

TfS implementation remains elusive, as it does with many voluntary school programs. At the Indoor Air conference in Monterey, US EPA/Region 2 staff presented its work in New Jersey: it has been able to initiate the voluntary program in only 1 percent of the schools in the State. TfS is sadly underutilized, and with a few States as exceptions, has not been incorporated into ongoing school facility work.

Implementation of *Healthy and High Performance Schools* provisions that give States funding and information for school renovations would greatly assist IAQ problems. Since implementation is scant and children are required to be in schools and schools have known air pollution problems, the real question is why is TfS only a voluntary program. The difficulty in defining what TfS implementation consists of is part of the problem; another is the basic difficulty in extracting timely and accurate information from schools about environmental conditions and child health; and finally, the need for substantial increases in research into indoor air is also required.

Drugging the Canaries.—Some children now need nebulizers just to attend polluted schools; entire districts have ordered them for their classroom buildings. Elsewhere, on physician orders, parents have kept children home. Some schools have quickly addressed the situation by providing home instruction, tutoring, building improvements, or alternative educational placements, while other parents are home schooling. We and other advocacy groups have also had calls from parents who report they have seriously ill children, have schools that have ignored physician letters, and also report their schools have threatened to report them for child neglect.

Needless to say, as committee members and staff are aware, schools receiving any Federal aid are required under Section 504 of the Rehabilitation Act of 1973 to provide accessible facilities. Under the Individuals with Disabilities Education Act (IDEA), schools must provide a free, appropriate public education to all children in the least restrictive setting.

The Outbreak of School Rashes

Centers for Disease Control (CDC) launched a Federal study of the outbreak of rashes that affected over 1,000 children in 27 States. Findings include the usual childhood diseases, eczema, applied chemicals and renovation dusts, and rashes of unknown origins. Despite some premature media reports that attempted to paint this as "female hysteria," the rashes appeared on both boys and girls, in different schools and in different classrooms, and in different States on the same day. At least one school in the State of Washington refused to allow the State to conduct an environmental investigation onsite. In surveying members of the NYS Association of School Nurses, HSN learned that nurses are not allowed to tell parents about school conditions and that 71 percent of 206 respondents knew children who were affected (HSN).

This is not a system set up to protect children and to determine what the exposures and results of those exposures are. We encourage Congress to hear from CDC/NCEH on how future school environmental investigations should be carried out.

RECOMMENDATIONS

The root problem is that there is no system to protect children, and no system to deliver or enforce a consistent message with local schools. It is beyond the jurisdiction of this committee acting alone to establish such a system, but we would urge future Senate committee Hearings to explore this issue and possible solutions in depth with the array of Federal agencies.

1. Fund and implement the *Healthy and High Performance Schools* provisions of the Leave No Child Behind Act, expanding the USD Education's ability to:

- participate in the National Children's Study;
- participate in the Interagency Task Force on Risks to Child Health;
- conduct joint research with other Federal agencies on how environmental hazards at school affect health and learning;
- provide incentives and information to the States to leverage their own "high performance schools" programs.

2. Institutionalize the National Clearinghouse for Educational Facilities and cross-link it to the other Federal agencies' school environmental programs;

3. Expand US Environmental Protection Agency's schools programs, establishing it as an agency priority, including:

- research on indoor air at school and impacts on child health and learning;
- evaluating IAQ Tools for Schools and other school programs for their effectiveness at reducing children's toxic exposures and reducing absenteeism, or providing disability access to buildings;
- strengthening the EPA regional office's work with State agencies and advocacy organizations so that IAQ Tools for Schools and other programs are integrated into State agency efforts;
- expand US EPA's grants to the Pediatric Environmental Health Specialty Units, jointly funded with the Agency for Toxic Substances and Disease Registry;
- require US EPA and other Federal agencies, in cooperation with environmental health and education groups, to develop best practice policies for school district maintenance and repair, consistent with "greening" the existing infrastructure for the protection of child health. This should include methods and examples for applying the Federal Executive Order on Environmentally Preferable Purchasing to school supplies and maintenance products.

4. Pass the Federal School Environmental Protection Act (SEPA, H.R. 111 and H.R. 3275/S 1716 in the 106th Congress) that will have the effect of making schools "pest-proof" their buildings and thus reduce their reliance on the routine use of highly toxic chemicals.

5. Fund school repairs and construction, directing a Federal grant program at high needs schools; and, offer tax credits to subsidize the interest on school construction bonds used for repairs, renovations, and new construction.

Special Thanks/Acknowledgements: Alliance to End Childhood Lead Poisoning; American Lung Association; Beyond Pesticides; Children's Environmental Health Network; Healthy Kids: The Key to Basics; PNew Civic Works; New York State Board of Regents Report of the Advisory Committee on School Environmental Quality; Rebuild American's Schools and, Healthy Schools Network research and publications on IAQ, Cleaning, Molds, Renovations, Daylighting, Access to Decision-Making, Survey of NYS School Nurses, NYC School Conditions; Schools of Ground Zero: Early Lessons Learned in Children's Environmental Health, APHA and HSN, 2002

STATEMENT OF ALEX WILSON, PRESIDENT, BUILDINGGREEN, INC.

Mr. Chairman and members of the committee, my name is Alex Wilson. I am very honored and pleased to have this opportunity to address the issue of high-performance or "green" schools before this committee.

I am president of BuildingGreen, Inc., a small company in Brattleboro that is recognized as one of the leading national providers of information on environmentally responsible design and construction. My company publishes Environmental Building News, which is read by over 10,000 architects and other building professionals nationally and internationally.

I also serve on the boards of the U.S. Green Building Council and the Sustainable Buildings Industry Council, both here in Washington and both involved in efforts to advance the implementation of energy-efficient, environmentally responsible buildings. I am pleased to report that the membership of the U.S. Green Building Council, which has been growing by 100 percent per year for the past 5 years, has just surpassed 2,000 companies, and the Leadership in Energy and Environmental Design (LEED) building rating program the organization runs is quickly becoming the most important driver of green design in the country.

The Sustainable Buildings Industry Council (SBIC) has been particularly active in advancing high-performance schools nationwide. Senator Bonds may be interested to learn that SBIC is today leading a workshop on high-performance buildings in St. Louis.

My hope here is to provide a quick overview of what a high-performance school is, address the benefits of these schools, describe a few examples, and provide recommendations as to how the Federal Government can support the implementation of high-performance school design, construction, and operation.

What is a High-Performance School?

The Collaborative for High Performance Schools in California defines high-performance schools as “facilities that improve the learning environment while saving energy resources and money.”¹ The Sustainable Buildings Industry Council (SBIC) describes a high-performance school as having three key characteristics:²

1. It is healthy and productive for students and teachers, in that it provides:
 - High levels of acoustic, thermal, and visual comfort;
 - Significant amounts of natural daylighting;
 - Superior indoor air quality; and
 - A safe and secure environment.
2. It is cost-effective to operate and maintain, because its design employs:
 - Energy analysis tools that optimize energy performance;
 - A life-cycle cost approach that reduces the total costs of ownership; and
 - A commissioning process to ensure that the facility will operate in a manner consistent with design intent.
3. It is sustainable, because it integrates:
 - Energy conservation and renewable energy strategies;
 - High-performance mechanical and lighting systems;
 - Environmentally responsive site planning;
 - Environmentally preferable materials and products; and
 - Water-efficient design.

Organizations seeking to advance high-performance schools all emphasize an integrated, whole-building approach to the design process. This means that the different elements—building envelope, lighting, mechanical systems, etc.—must be considered holistically, from the beginning of the design process through construction and operation of the building.

This is quite different from the design process used in creating most non-residential buildings. The conventional design process is like a relay race, in which the architect designs the basic building and passes the baton to the mechanical engineer. The mechanical engineer designs the mechanical systems needed to maintain comfort, then passes the baton on to the lighting designer, and so on. With integrated design, all members of the design team meet periodically throughout the planning and design process. Synergies are identified—for example, recognition that if better glazings and energy-efficient lighting systems are installed, the air conditioning system (chiller) can be downsized. Identifying these opportunities becomes possible only through a collaborative, or integrated design process.

The other key aspect of a high-performance school is that it is the product of well-thought-out goal-setting on the part of the school district and the design team.

I am currently the environmental consultant on a complex school project in Brattleboro, VT. This is the largest school construction project ever undertaken in Vermont, involving three schools serving 1,600 students. With a \$57 million budget, the project will involve 184,000 square feet of renovation and 126,000 square feet of new construction over a 4-year construction phase. Listed below are several of the sustainability goals identified by the design team at the beginning of the design process:³

- Exceed ASHRAE 90.1 (1999) energy performance levels by at least 20 percent
- Reduce total greenhouse gas emissions for the building complex by 50 percent, despite a 45 percent increase in total square footage (much of this to be met by a wood-chip-fired distributed heating system);
- Achieve significant daylighting (2 percent daylight factor) in 60 percent of classrooms;

¹ Best Practices Manual, Volume I—Planning, the Collaborative for High Performance Schools, 2001.

² High Performance School Buildings: Resource and Strategy Guide, Sustainable Buildings Industry Council, Washington, DC, 2001.

³ BUHS/BAMS/SVCEC—Renovations & Additions: Project Feasibility Report, Truex Cullins & Partners, May, 2002.

- Generate no net increase in stormwater runoff from the site, despite a significant increase in impervious surfaces;
- Reduce per-square-foot water consumption by 40 percent;
- Reduce student, teacher, and staff absenteeism by at least 10 percent compared to prior 3 years by improving indoor air quality;
- Provide recycling and composting facilities that can achieve an 80 percent recovery for solid waste generated by the school; and
- Achieve a building that would earn a LEED Silver rating.

BENEFITS OF HIGH-PERFORMANCE SCHOOLS

The benefits of a high-performance school accrue to students, teachers, taxpayers or other supporters of a facility, and the local, regional, and global environment. Eight primary benefits are described below:

1. *Improved Student Performance*

While data is still limited, there is growing evidence that a school's physical condition—especially its lighting and indoor air quality (IAQ)—can have a direct impact on student performance. The most comprehensive study to date, conducted in school districts in California, Washington, and Colorado, examined the causal relationship between natural daylighting and student performance. In the California district studied, students in classrooms with the most daylight progressed 20 percent faster on math tests and 26 percent faster on reading tests over the course of 1 year compared to students in classrooms with the least daylighting.⁴ An earlier, less scientific study in North Carolina produced similar findings.

Benefits don't only accrue to new, well-funded schools. Here in Washington, DC, the renovation of the run-down Charles Young Elementary School, completed in 1997, resulted in dramatic improvements in math and reading test scores. Prior to the restoration, almost half of the students scored in the lowest quartile on standardized tests (49 percent in math and 41 percent in reading); after the renovation, those percentages dropped to 24 percent and 25 percent, respectively.⁵

These studies confirm what teachers, students, and parents have known anecdotally for years: a better facility—one with good acoustics, lighting, indoor air quality, and other high performance features—will enhance learning.

2. *Increased Average Daily Attendance*

A high-performance school provides superior indoor air quality by controlling sources of contaminants, providing adequate ventilation, and preventing moisture accumulation. Through these strategies, pollutants are kept out of classrooms, stale air is eliminated, and mold growth is inhibited—all of which will keep students healthier and reduce absenteeism, especially among those suffering from respiratory problems. Indoor environments are believed to be a major causal factor of asthma, which is mushrooming in significance and now affects approximately one out of eight children in America.⁶ In some States, such as California, a school's operating budget is dependent on the average daily attendance, so an increase in attendance boosts the operating budget. The renovation of the Charles Young Elementary School resulted in an increase in student attendance from 89 percent to 93 percent.⁷ The U.S. Environmental Protection Agency (EPA) has a useful summary of studies addressing indoor air quality and student health.⁸

3. *Increased Staff Satisfaction and Retention*

High-performance schools are designed to be pleasant places to work. They are visually and thermally comfortable, incorporate good acoustics to minimize distraction, and provide indoor air that is fresh and clean. Such environments become posi-

⁴“Daylighting in Schools: An Investigation into the Relationship Between Daylighting and Human Performance,” by the Heschong Mahone Group for Pacific Gas & Electric, August, 1999. A follow-up Re-Analysis Report released in February, 2002 responded to technical questions that had been raised by reviewers and verified the original results. Reports available at www.h-m-g.com and www.newbuildings.org/PIER.

⁵“Healthy School Environment and Enhanced Educational Performance: The Case of Charles Young Elementary School, Washington, DC,” by Dr. Michael A. Barry, prepared for the Carpet and Rug Institute, January, 2002.

⁶1999 data from the American Lung Association showing an incidence of 121.8 asthma cases per 1,000 among people aged five to 17. This age group has the highest incidence rate of asthma, well above the average for all people (90.0 cases per 1,000). “Trends in Asthma Morbidity and Mortality,” American Lung Association, Epidemiology and Statistics Unit, February, 2002.

⁷“Healthy School Environment and Enhanced Educational Performance: The Case of Charles Young Elementary School, Washington, DC,” by Dr. Michael A. Barry, prepared for the Carpet and Rug Institute, January, 2002.

⁸EPA Office of Indoor Air Quality, <http://www.epa.gov/iaq/schools/perform.html>.

tive factors in recruiting and retaining teachers and in improving overall teacher satisfaction.

4. Reduced Operating Costs

K–12 schools in the U.S. spend approximately \$6 billion dollars per year on energy—this is more than they spend on computers and textbooks combined.⁹ High-performance schools are designed—using life-cycle costing methods—to minimize long-term costs of operation. They use significantly less energy and water than conventional schools and are designed to be easier to maintain. Many high-performance schools built over the past several years are realizing energy savings of 40 percent or more. A school in Iowa is even using windmills to generate more power than it uses and will soon be supplementing its operating budget with this revenue stream! The benefits of reduced operating costs in high-performance schools will continue throughout the life of the buildings.

5. Reduced Liability Exposure

Because high-performance schools are healthy, they reduce a school district's liability exposure over health-related lawsuits. In the past few years, a number of highly publicized school closings, such as that of the McKinnely School in Fairfield, Connecticut, have occurred due to mold problems. The high cost of remediation in schools with IAQ problems (often a quarter-million dollars in a school) are reason alone to do it right the first time. While we still have a lot to learn about such building science issues as mold and moisture control, high-performance schools are generally designed with much greater attention to these issues than conventional schools.

6. Reduced Environmental Impacts

High-performance schools are designed to have low environmental impact. They use energy and water efficiently. They use durable, nontoxic materials that are high in recycled content and can themselves be recycled. Attention is paid to protecting wetlands and natural areas on the school grounds, and efforts are made to allow stormwater to infiltrate into the ground, replenishing groundwater, rather than being carried offsite in storm sewers. Many of these schools are being built to use non-polluting, renewable energy systems to the greatest extent possible. Wastes are minimized or recycled during construction. And the schools are designed to facilitate recycling of waste during operation. Through measures such as these, high-performance schools are good environmental citizens.

7. Using the School as a Teaching Tool

Schools are places of learning, and many of the technologies and techniques used to create high-performance schools can also be used as teaching tools. Renewable energy systems—solar, wind, and biomass—are ideal hands-on demonstrations of scientific principles. Mechanical and lighting equipment and controls can illustrate lessons on energy use and conservation. Daylighting systems can help students understand the daily and yearly movements of the sun. Wetlands and other natural features on a school grounds can be used as outdoor laboratories.

The Alliance to Save Energy, of which Senator Jeffords is vice-chair, has offered since 1996 a tremendous program encouraging energy savings in existing buildings. Their Green Schools Program gets students involved with assessing energy issues in their schools, implementing changes, and monitoring the results.¹⁰ Through this program, schools in Pennsylvania, New York, and Washington saved an average of \$7,700 per year on energy bills (10–15 percent) with no expenditure.

8. Schools as Disaster Shelters

Schools often play a role in a community's disaster planning—serving as storm shelters, central collection points during evacuations, or emergency housing during extended power outages. High-performance school buildings built to incorporate natural daylighting, highly energy-efficient envelope systems, and renewable power generation can function far better during power outages than conventional buildings.

HIGH-PERFORMANCE SCHOOLS: A FEW EXAMPLES

Described below are a few high-performance schools in operation (or nearing completion) around the country.

⁹ Alliance to Save Energy, www.ase.org.

¹⁰ Alliance to Save Energy, www.ase.org/greenschools.

Boscawen Elementary School, New Hampshire

Completed in 1996 and located just north of Concord, this elementary school was designed with a special focus on indoor air quality. The school it replaced was so crowded that some classes were held in hallways and the air so bad that people were regularly getting sick; the school was even evacuated once due to foul odors. Designed by the H.L. Turner Group, the 48,000 square-foot school for 400 students was the first in the U.S. to be designed to provide 100 percent fresh air to the building using a “displacement ventilation” system, controlled by carbon dioxide monitors. Ventilation air flows upward through the classrooms and better air quality is provided with less than half the typical ventilation rates in schools (and much lower fan energy). An energy-efficient building shell is combined with extensive daylighting, energy-efficient electric lighting, and low-VOC materials. An integrated, whole-building design process was used, and, remarkably, construction costs for the building were only \$65 per square foot in 1996 dollars (exclusive of site costs).

Edgerly Early Childhood Development Center, Somerville, Massachusetts

Designed by HMFH Architects, Inc. and currently under construction, the 80,000 square-foot Edgerly Center will serve 560 pre-kindergarten through first-grade children in this city outside Boston. Somerville is the most densely populated city in New England, so carving out a site for the school was difficult. The need to share functions with a neighborhood park led to other green considerations for the school. A wide range of energy-saving and sustainability features were included in the design, such as extensive daylighting, high-performance glazings, high insulation levels around the entire envelope, superb acoustical isolation, and low-VOC and natural building materials. With funding from the Massachusetts Green School Pilot Program, a fairly large (25–32 kW) photovoltaic (solar electricity) system will be installed on the school, and a small (400 W) wind turbine will be erected in the community garden at the school. The energy features are projected to reduce energy consumption by 31 percent, compared with a conventional new school. Total cost of the school is expected to be \$152/square foot.

Clearview Elementary School, Hannover, Pennsylvania

Due to be completed this fall, Clearview Elementary School was one of five buildings nationwide selected to represent the United States at the International Green Building Challenge, held last week in Oslo, Norway. This 44,000 square-foot, two-story school, designed by Kimball Architects of Harrisburg, Pennsylvania, is designed to achieve a 40 percent savings in energy and 30 percent savings in water, compared with a standard school. Among green design strategies employed in the building are daylighting, a high-performance envelope (high insulation levels and advanced glazings), a ground-source heat pump system, an access-floor system for conditioned air supply, demand-controlled ventilation (with carbon dioxide sensors), extensive use of recycled-content building materials, and use of low-VOC paints and other products. Total construction costs were \$133 per square foot, exclusive of site work and design fees. The building is expected to achieve a LEED Silver rating.

Dalles Middle School, Oregon

This 96,000 square-foot school serving 600 middle-school students 80 miles east of Portland opened in September, 2002. Designed by BOORA Architects of Portland and built for \$12.5 million, the school features a sophisticated daylighting system with light shelves and light tubes to bring natural light deep into the school interior. The school makes superb use of an unusual resource: groundwater pumped from a nearby hillside to reduce landslide risk. This 58- to 60-degree water is used in a ground-source heat pump that provides both heating and cooling for the school. Natural ventilation is used whenever outside temperatures permit, and a wide variety of recycled-content, locally sourced, and nontoxic building materials were used. Overall savings in annual energy consumption are projected to be 46 percent, compared with a conventional school. The school was built for \$105 per square foot, excluding site work.

Ross Middle School, Ross, California

The original Ross School was built in 1941 and a series of six, fairly haphazard additions had been added over the years to expand capacity. In Phase I of the most recent effort, designed by EHDD Architects and completed in 2000, five existing middle-school classrooms were replaced with nine new classrooms and support facilities on two floors. This addition is heavily daylit. Comfort is maintained using natural ventilation rather than an air conditioning system, saving \$200,000 on mechanical equipment (these savings paid for all of the other green features). Considerable attention was paid to material selection to avoid IAQ problems and make use of recycled-content and sustainably sourced materials. For example, 90 percent of all

wood used in the building was certified as sustainably harvested, and arsenic-treated wood was avoided in favor of safer pressure-treated wood.

McKinney Elementary School, Texas

Located near Dallas, Texas and designed by the SHW Group in Dallas, the priorities of this school were quite different from those mentioned above. Because water was a very significant issue, an extensive rainwater harvesting system using the school's roof was designed to provide water for outdoor irrigation. Completed in 2000, the 70,000 square-foot building uses extensive daylighting throughout. Energy-conserving electric lighting technologies are used, native landscaping is emphasized, and a great deal of attention was paid to selection of green building materials. Another key feature at the McKinney School was attention to how building features and elements could be used as teaching tools. The school was named one of the AIA Committee on the Environment Top Ten green buildings for 1999.

Durant Road Middle School, Raleigh, North Carolina

The 149,000 square foot school for 1,300 students was completed in 1995 as one of the first examples of a heavily daylighted, "green" school. Some of the daylighting strategies used in this school have been adopted in schools across the country. Designed by Innovative Design, the school is realizing annual savings in energy for lighting, cooling, heating, and ventilation of 50–60 percent. Construction costs came in at \$3.6 million under-budget!

RECOMMENDATIONS

The movement to create high-performance, green schools is moving along at a healthy pace. The U.S. Green Building Council, for example, has 32 K–12 schools registered for certification under the LEED rating program.¹¹ These schools are located in 14 States and represent approximately 4.5 million square feet of floor space. However, compared with the magnitude of school construction occurring today, this is just a drop in the bucket.

American School & University reports in its 28th Annual Official Education Construction Report that \$26.7 billion in K–12 school construction was completed in 2001.¹² This was split between new construction (42 percent), additions (16 percent), and modernizations (42 percent). During the period 2002 through 2004, total K–12 school construction is expected to total \$108 billion. Nationwide, a total of 6,000 new schools are expected to be built by 2007.¹³

Clearly, a lot of school design and construction is occurring. Each new building will be occupied, hopefully, for 50 to 100 years. For the vast majority of them, very little if anything is being done to ensure that they will be high-performance.

While not by any means a comprehensive list, the following are offered as initial recommendations of how the Federal Government could support the creation of high-performance schools. These recommendations are grouped into several areas.

RESEARCH

- Support carefully designed, scientifically based studies to measure the effect of high performance schools on attributes such as academic performance, absenteeism, teacher satisfaction and retention, and operating costs of school buildings (including energy, water, maintenance, and repairs).
- Support building science research to learn more about the causal factors of indoor air quality and moisture problems in buildings. One aspect of this could be the development of a protocol for evaluating what the long-term moisture performance (i.e., mold risk) of a building is likely to be based on its design.
- Support research on IAQ remediation, particularly mold problems, in buildings.
- Support research into advanced mechanical and electrical "packages" that could greatly improve school design and simplify their integration into high-performance buildings. Such systems could include displacement air delivery systems and lighting control systems. Until integrated packages are developed that are pre-engineered and perhaps even pre-manufactured, implementing leading-edge HVAC and lighting systems with require expensive custom engineering. Efforts to encourage manufacturers to invest in the development of such packaged HVAC and lighting systems could be structured like the "Golden Carrot" awards for high-efficiency refrigerators several years ago.

¹¹ U.S. Green Building Council, LEED Building Registration List, 23 September, 2002.

¹² "28th Annual Official Education Construction report," American School & University, May 2002; www.asumag.com.

¹³ High Performance School Buildings: Resource and Strategy Guide, Sustainable Buildings Industry Council, Washington, DC, 2001.

- Support prototype development of high-performance portable (relocatable) classrooms. In some States a high proportion of K–12 students are housed in portable classrooms—one-third of students in California, for example. Portable classrooms today often have poor indoor air quality, low energy performance, and poor acoustic performance.
- Support the development of improved daylighting design tools. According to some architects, the lack of a plug-in module for DOE-2 to accurately model the energy impacts of daylighting is a significant obstacle.¹⁴ Rather than funding development of an end-user tool, Federal support should go into the building blocks of such simulation tools, such as the calculation engine and data sets. Creating design tools that use those components should probably remain the purview of the private sector.
- Support the development of national protocols for quantifying hazardous emissions from building materials.

EDUCATION AND TECHNOLOGY TRANSFER

- Fund the dissemination of planning guides, design manuals, general information resources for the lay public, and other resources to assist in the creation of high-performance schools on a State and local level. While a few States, such as California, Oregon, Pennsylvania, and Massachusetts, already have effective state-wide programs in place to promote high-performance schools, most States do not. Excellent resources on high-performance schools are already available—from the Sustainable Buildings Industry Council, the California High Performance Schools Program, EPA, and DOE (especially the EnergySmart Schools Program). Support is needed to effectively disseminate these materials through State education departments.
- Fund educational workshops, seminars, and other training programs on high-performance school design and construction.
- Fund the compilation and Internet posting of information on leading examples of high-performance schools. The DOE High Performance Buildings Program maintains a data base of high-performance buildings, and includes a category for K–12 schools.¹⁵
- Fund the creation of regional videos about high-performance schools that can serve to educate school boards and communities about the benefits of such practices. The State of Pennsylvania has just produced a superb half-hour program.¹⁶

SUPPORT OF HIGH-PERFORMANCE SCHOOL DESIGN AND CONSTRUCTION

- Provide flow-through (block grant) funding to State education departments to pay for computer modeling during the design of high-performance schools and commissioning¹⁷ of schools prior to occupancy. Energy modeling and commissioning are two critical steps in the creation of high-performance schools, but they are expenses that are often seen as expendable. Computer modeling for a moderate-sized school may cost \$10,000 to \$15,000 and commissioning can cost from ½ to 1½ percent of the total construction budget. The Healthy and High Performance Schools component of the 2001 Education Bill provides a mechanism for this, but additional funding is required for that effort to reach its potential.

SUPPORT OF A COLLABORATIVE EFFORT TO ADVANCE HIGH-PERFORMANCE SCHOOLS

- Fund the development of a LEED for Schools Application Manual. This could be a collaborative effort among the U.S. Green Building Council, the California High Performance Schools Program, the Sustainable Buildings Industry Council, and perhaps other organizations. The LEED program provides a third-party mechanism for certifying the “greenness” of buildings. This third-party verification is very important in ensuring that the best of intentions on the part of a school board or community are really turned into the best building.

¹⁴ Personal communication with Mike Nicklas, FAIA, of Innovative Design, a North Carolina firm well-known for designing daylight schools.

¹⁵ See <http://www.eren.doe.gov/buildings/highperformance/case-studies/>.

¹⁶ “Better Places to Learn: Building Green Schools in Pennsylvania,” Governor’s Green Government Council, www.gggc.state.pa.us.

¹⁷ Commissioning is a quality-assurance step that can be taken prior to occupancy to ensure that building systems are performing as they were designed. If commissioning identifies problems with the construction of the building, it may be possible to have corrective measures taken at no cost to the school district.

SUMMARY

More than any other type of building, schools are an investment in our country's future. We are in a period of dramatic growth in the number of schools, and that offers a tremendous opportunity to improve these places of learning even as we significantly reduce their use of energy and other resources. We know how to do that. Dozens of high-performance schools have been being built over the past few years and many more are on the drawing boards. But for high-performance features to be incorporated into all schools, we need to identify key leverage points and assist at these points. Integrated, whole-systems design is the mechanism to do that, and the Federal Government can do a great deal to make that available to school systems nationwide.

I thank you, Senator Jeffords and committee members, for this opportunity to address these issues today. I look forward to following the high-performance schools agenda and would be glad to follow up on any of these ideas with committee staff. I am sure that the two organizations I represent, the U.S. Green Building Council and the Sustainable Buildings Industry Council, would also be happy to provide additional information at any time.

STATEMENT OF LOIS MARIE GIBBS, EXECUTIVE DIRECTOR, CENTER FOR HEALTH
ENVIRONMENT AND JUSTICE

Thank you for this opportunity to speak with you on an issue that has concerned me for over 20 years. You may be familiar with my involvement in Love Canal, which led to my being termed the "Mother of Superfund," the Federal Superfund law. What you may not know is that the struggle to relocate the residents of Love Canal began with my concern over the health hazards faced by children at the 99th street elementary school. The school was built on the perimeter of a toxic waste site and the students, which included my son, were in danger.

Children are powerless against many dangers in school and out, and they look to adults for protection. However, decisions that adults make frequently endanger our nation's children. New schools are being built on or near chemically contaminated land or near industrial facilities that release toxic emissions that contaminate the air children breathe, the water they drink and play in and the soil they play in.

There is growing evidence that these chemical exposures—these invisible threats—diminish our children's health and intellectual abilities. Research has revealed increasing numbers of children afflicted with asthma, cancers, lower IQs, and learning disabilities, which impede their ability to develop to their full potential. From birth, children are exposed to toxic chemicals in many ways. Public schools when built on or near contaminated land are a potential source of chemical exposure.

While laws compel children to attend school, there are—astoundingly—no guidelines or laws in place that compel school districts to locate school buildings on property that will protect the school population from environmental health and safety risks. California is the only State that has some regulations and an assessment process for the building of new schools. Consequently, parents are forced to send their children to some schools that pose a threat to their children's health and ability to learn.

CHEJ has received numerous inquiries from parents who either:

- were concerned about an existing school where there was a higher than expected number of students with cancer or other diseases;
- found toxic chemicals in the soil of a school campus;
- or were concerned about the construction of a new school on contaminated lands.

In response to these requests, CHEJ decided to bring these parents together to explore the depth of the problem (See attached list of community school contamination situations.). Additionally, we began to undertake research to identify laws that govern such situations. We were stunned to find that there were no laws governing the siting of a school with the exception of California. In fact, we found that there were strict laws and regulations around the construction of homes and commercial buildings but not schools. This raised two fundamental questions for leadership.

1. How many schools are located on or near chemical waste sites or other contaminated sites today?
2. Is there a need for national or statewide legislation that would prohibit building a school on contaminated property or set cleanup guidelines when there is no alternative but to use contaminated property?

To answer these questions, we looked at the location of public schools in five States and overlaid the location of known Federal and State identified contaminated

sites. In January we released the results in the Child Proofing Our Communities Campaign's School Siting Committee report *Creating Safe Learning Zones*. In this report, the campaign revealed that 1,195 schools are located within one half mile of a known toxic site in these five States affecting an estimated population of over 620,000 students.

Table 1: Number of Public Schools and Students Attending Classes Within a Half-Mile of a Superfund or State-Identified Contaminated Site

State	Number of Schools	Number of Counties	Estimated Number of Students	Lists Used to Identify Toxic Sites
California	43	11	32,865	Superfund only.
Massachusetts	818	13	407,229	Superfund & State.
Michigan	64	27	20,999	Superfund & State.
New Jersey	36	11	18,200	Superfund only.
New York	235	39	142,738	Superfund & State.
Total	1,196	100	622,031	

Based on the report's findings, we believe there is a critical need for national laws ensuring that the locations for new schools are safe and that, if contaminated property is considered, it is properly cleaned up. The campaign has developed model school siting legislation to promote laws and policies (covering both public and private primary and secondary schools) that protect children's health. Additionally, with the proposal of building over 2,400 new schools in 2003–2005 there is an immediate need to define criteria and appropriate funds to ensure that new schools are designed and built to protect children's health.

The following are model school siting guidelines that the Child Proofing Our Communities campaign recommends be considered as part of legislation written to ensure the safety of the school population. This model draws upon existing California legislation (AB 387 and SB 162, 1999) that mandates the California Department of Toxic Substances Control (CDTSC) to perform Preliminary Endangerment Assessment's (PEA's) on proposed school sites.

1. THE ESTABLISHMENT OF A SCHOOL SITING COMMITTEE

The public body responsible for siting new schools is usually the local school board or a school district committee. This group should establish a school siting committee whose job is to recommend to the public body sites for building new schools and/or expanding existing schools. The committee should include representatives of the public body as well as representatives from the following stakeholders: parents, teachers, school health nurse or director, officials from local health departments, community members, local public health professionals, environmental advocacy groups, and age-appropriate students. Only public bodies who have appointed school siting committees representing such stakeholders should be eligible to receive Federal money for the assessment and cleanup of school sites or the construction of new schools.

2. PUBLIC INVOLVEMENT

The public body (the school board or school district committee) should notify parents, school staff, members of the local community, and "feeder" school parents of the new school's students of plans to build a new school and solicit their participation in writing and at public meetings. This outreach effort should include prominent placement of public notices and feature articles about the proposed plan in commonly read newspapers or local magazines. A notice shall be posted in a conspicuous place in every school within the public body's jurisdiction (in multiple languages if there's a significant number of non-English speaking parents). A copy shall also be delivered to each parent-teacher organization within the jurisdiction, each labor union covered by a collective bargaining agreement signed by the public body, and each landowner within 1,000 feet of the proposed site. This effort can also be used to recruit participants for candidates for the school siting committee.

3. CATEGORICAL EXCLUSIONS FOR SCHOOL SITES

Under no circumstances should a school be built on top of or within 1,000 feet of a site where hazardous or garbage waste was landfilled, or where disposal of construction and demolition materials occurred. To determine whether the proposed

school site has been used for these purposes, an initial Environmental Assessment should be undertaken, and, if necessary, a more extensive Preliminary Endangerment Assessment. If either evaluation reveals that the site has been used for these purposes, or if the site is within 1,000 feet of any property used for these purposes, the site must be abandoned.

4. PROCESS FOR EVALUATING SITES

The public body shall not proceed to acquire a site or prepare a site for construction of any school, including the expansion of an existing school, until the public body completes the required environmental evaluations and the State environmental regulatory agency approves the initial Environmental Assessment. Based on the results of this initial assessment, a more extensive investigation, a Preliminary Endangerment Assessment, may be required. Based on the results of the PEA, a Site Remediation Plan may also be necessary.

A. Initial Environmental Assessment

Once a site is proposed, the school board/district committee must hire a licensed environmental assessor to conduct a three-part environmental assessment that is designed to collect information on current and past site uses and to conduct initial environmental sampling at the site. This assessment shall include:

Part I: A site history by reviewing public and private records of current and past land uses; historical aerial photographs; environmental data bases; Federal, State and local regulatory agencies' files; a site visit; and interviews with persons familiar with the site's history.

Part II: A small-scale grid sampling and analysis of soil, soil gases (if any) and groundwater. Air should be sampled if stationary or mobile sources of air pollution are near the proposed site, potentially exposing children to higher levels of pollution than found in their own communities. Any surface water should also be sampled.

Part III: Identifying any environmental hazards within two miles of the site, including industrial sites, chemical storage facilities, facilities found in EPA's Toxic Release Inventory (TRI), waste treatment plants, landfills, military sites, research facilities, and Department of Energy sites.

If the Initial Environmental Assessment concludes that the site was previously used for hazardous or garbage waste disposal, or for disposal of construction and demolition materials, or if it is within 1,000 feet of any property used for these purposes, the site must be abandoned.

If some contamination is discovered, the levels found should be compared to a list of cleanup guidelines developed by the New York State Department of Environmental Conservation (see table 2 and discussion below). If contaminant levels exceed any of these values, a more extensive site assessment—a Preliminary Endangerment Assessment (PEA)—is necessary.

A Preliminary Endangerment Assessment would also be necessary if the Initial Environmental Assessment found that the proposed school site lies within 1,000 feet of one of the following potential sources of contamination:

- A suspected hazardous, industrial, or municipal waste disposal site
- Refineries, mines, scrap yards, factories, dry cleaning, chemical spills, and other contaminants
- Agricultural land
- Dust generators such as fertilizer, cement plants, or saw mills
- Leaked gasoline or other products from underground storage tanks
- Concentrated electrical magnetic fields from high intensity power lines and communication towers
- Areas of high concentrations of vehicular traffic such as freeways, highways
- Industrial plants and facilities
- An USEPA or State designated Brownfield site
- A railroad bed
- An industry listed in EPA Toxic Release Inventory (TRI)

If no environmental hazards were identified at the property then the property would be considered suitable for school site development.

The State environmental regulatory agency must review the final draft of the Initial Environmental Assessment. Depending on the thoroughness of the assessment, the State agency would either give preliminary approval to the assessment, disapprove the assessment, or request more information.

When the final draft of the Initial Environmental Assessment is complete and has received preliminary approval by the State environmental regulatory agency, the public body shall publish a notice in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) that includes the following information:

A statement that an initial Environmental Assessment of the site has been completed; a brief statement describing the results of the assessment such as a list of contaminants found in excess of regulatory standards; prior uses of site that might raise health and safety issues; proximity of site to environmental hazards (waste disposal sites, point sources of air pollution, etc.); a brief summary of the conclusions of the initial Environmental Assessment; the location where people can review a copy of the assessment or an executive summary written in the appropriate foreign language; and an announcement of a thirty-day public comment period including an address where public comments should be sent.

A copy of this notice shall also be posted in a conspicuous place in every school within the public body's jurisdiction (in multiple languages if there is a significant number of non-English speaking parents). A copy shall also be delivered to each parent-teacher organization within the jurisdiction, each labor union covered by a collective bargaining agreement signed by the public body, and each landowner within 1,000 feet of the proposed site.

The State environmental regulatory agency will review all comments received on the Initial Environmental Assessment. This agency will then accept or reject the conclusion of the assessment, determine whether the site can be used without further remediation or study, whether the site is categorically excluded for use as a school, or whether further study or remediation of the site (i.e., a Preliminary Endangerment Assessment) is required. The State environmental agency shall explain in detail the reasons for accepting or rejecting the assessment.

After the State environmental agency has approved the Initial Environmental Assessment, the local School Siting Committee must also review the assessment and public comments received. The purpose of this review is for the School Siting Committee to make a recommendation to either abandon the site or continue evaluating the environmental hazards at the site with a Preliminary Endangerment Assessment or PEA.

If a PEA is required, the School Siting Committee should recommend to the public body whether to abandon the site or proceed with a PEA. Alternative sites should be considered at this point. Then, the public body must vote whether to abandon the site or proceed with a PEA.

B. Preliminary Endangerment Assessment

A Preliminary Endangerment Assessment (PEA) is an in depth assessment of the environmental contamination present at a site. A licensed environmental assessor must do this assessment. The State environmental regulatory agency shall oversee the PEA process and issue regulations that prescribe the precise contents of the PEA. A model for such regulations can be found in California, where the PEA must meet the California Department of Toxic Substances Control Preliminary Environmental Assessment Guidance Manual requirements (CEPA, 1994). The PEA must also be approved by the State environmental regulatory agency.

Before any work is done on the PEA, the public body must develop a public participation plan that ensures public and community involvement in the PEA process. The plan shall indicate what mechanisms the public body will use to establish open lines of communication with the public about the use of the site as a school. Activities such as public meetings, workshops or fact-sheets may be appropriate ways to notify the public about the proposed PEA investigation activities (such as the taking of soil, groundwater and air samples) and schedules. The State environmental regulatory agency must approve the public participation plan before the public body can commence other PEA-related activities.

The primary objective of the PEA is to determine if there has been a release or if there is a potential for a release of a hazardous substance that could pose a health threat to children, staff, or community members. As part of the PEA, full-scale grid sampling and analysis of soil, soil gases (if any) and groundwater shall be undertaken to accurately quantify the type and extent of hazardous material contamination present on the site. The PEA will also contain an evaluation of the risks of actual or potential contamination posed to children's health, public health, or the environment based on the contamination found. The evaluation of risks shall include:

- A description of health consequences of long-term exposure to any hazardous substances found onsite;
- A description of all possible pathways of exposure to those substances by children attending school onsite; and
- The identification of which pathways would more likely result in children being exposed to those substances.

The PEA shall conclude that (1) there are no environmental hazards at the site which must be abated through a cleanup plan; or (2) the site was previously used for hazardous or garbage waste disposal, for the disposal of construction and demoli-

tion materials, or is within 1,000 feet of any property used for these purposes (the categorical exclusion); or (3) the site must be cleaned up if it is to be used for a school. If the site was previously used for hazardous or garbage waste disposal, for the disposal of construction and demolition materials, or is within 1,000 feet of any property used for these purposes, the site must be abandoned. If the site must be cleaned up, the PEA shall identify alternatives for cleaning the site to meet the applicable safety standards.

The State environmental regulatory agency must review the final draft of the PEA. Depending on the thoroughness of the assessment, the State agency must give preliminary approval to the assessment, disapprove the assessment, or request more information.

When the final draft of the PEA is completed and has received preliminary approval by the State environmental regulatory agency, the public body shall publish a notice in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) that includes the same information released for the Initial Environmental Assessment:

- A statement that a PEA of the site has been completed;
- A brief statement describing the results of the PEA, such as a list of contaminants found in excess of regulatory standards, prior uses of site that might raise health and safety issues, proximity of site to environmental hazards (waste disposal sites, point sources of air pollution, etc.);
- A brief summary of the conclusions of the PEA;
- The location where people can review a copy of the PEA or an executive summary written in the appropriate local language(s); and
- An announcement of a thirty-day public comment period, including an address where public comments should be sent.

As described for the Initial Environmental Assessment, a copy of this notice shall also be posted in a conspicuous place in every school within the public body's jurisdiction (in multiple languages if there is a significant number of non-English speaking parents). A copy shall also be delivered to each parent-teacher organization within the jurisdiction, each labor union covered by a collective bargaining agreement signed by the public body, and each landowner within 1,000 feet of the proposed site.

The State environmental regulatory agency will review all comments received on the PEA. The State environmental agency shall then either accept or reject the conclusion of the PEA, determine whether the site can be used without further remediation or study, whether the site is categorically excluded for use as a school, or whether a Site Remediation Plan is required. The State environmental agency shall explain in detail the reasons for accepting or rejecting the PEA.

After the State environmental agency has approved the PEA, the local School Siting Committee must also review the assessment and public comments received. The purpose of this review is for the School Siting Committee to make a recommendation to either abandon the site or consider remediation. Alternatives should be considered at this point. Then, the public body must vote whether to abandon the site, proceed with a remediation plan, or consider an alternative site or option.

If the PEA indicates that the site has a significant hazardous contamination problem, the public body must either abandon the site or fund a cleanup plan that would reduce contaminant levels to the applicable safety standard for each contaminant. The public body must abandon the site if the PEA uncovers that the site was previously used for hazardous or garbage waste disposal, for disposal of construction and demolition materials, or is within 1,000 feet of any property used for these purposes.

C. Child Protective Health Based Standards

The Child Proofing Our Communities campaign found that no health-based child-sensitive standards exist at the Federal, State, local, or any level for determining "safe" levels of contamination in soil that will protect children. Lacking such standards, parents, school districts, regulating agencies, and others are lost as to how to evaluate contamination at new or existing sites. Until such standards are developed, the campaign recommends the use of the New York State (NYS) Recommended Soil Cleanup Objectives. These values were developed to provide a "basis and procedure to determine soil cleanup levels" at State and Federal superfund and other contaminated sites in the State.

The Child Proofing Our Communities campaign, in conjunction with environmental engineers we convened at a Children's Environmental Health Symposium earlier this year, reviewed the cleanup standards or guidelines for several States

and found the NYS values to be generally lower than all others considered. A sub-committee of professional engineers and health scientists who participated in the Symposium concluded that the NYSDEC list is a good, reasonably sound, and conservative list to use as an initial screen to provide school boards/districts with a way to evaluate sites early on in the site selection process.

A table of 27 common contaminants from the NYS list of Recommended Soil Cleanup Objectives is included below. The entire list provides guidelines for 126 contaminants.

New York State Recommended Soil Cleanup Objectives For Chemicals Commonly Found at Contaminated Sites

Solvents	Pesticides / other metals
Acetone	0.2
Aldrin/dieldrin	0.041
Arsenic	7.5
Benzene	0.06
Chlordane	0.54
Barium	300
2-Butanone	0.3
Chrysene	0.4
Cadmium	1
Carbon tetrachloride	0.6
DDT/DDE	2.1
Chromium	10
Chloroform	0.3
Naphthalene	13.0
Lead	400
1,1-Dichloroethane	0.2
Pentachlorophenol	1.0
Mercury	0.1
1,2-Dichloroethane	0.1
PCBs	1.0
Nickel	13
Methylene chloride	0.1
Tetrachlorethene	1.4
Trichloroethene	0.7
Toluene	1.5
Vinyl chloride	0.2
Xylene	1.2

Note: All values are in parts per million (ppm).

D. Site Remediation Plan

If the school board/district decides to proceed with cleanup of the proposed site, a Site Remediation Plan must be developed. This plan must:

- Identify alternative methods for cleaning the site to contamination levels that meet the applicable safety standards;
- Contain a financial analysis that estimates and compares soil cleanup costs for the identified alternative cleanup methods that will bring the site into compliance with applicable safety standards;
- Recommend a cleanup plan from the alternatives identified;
- Explain how the recommended cleanup alternative will prevent children from being exposed to the hazardous substances found at the site; and
- Evaluate the suitability of the site in light of recommended alternative sites and alternative cleanup plans.

The public body shall submit the Site Remediation Plan to the State environmental regulatory agency for approval. Before submitting the plan for approval, a draft remediation plan shall be given to the School Siting committee for review and comment. Once the remediation plan is submitted to the State agency for approval the public body shall proceed with a public notification and outreach plan similar to that conducted for the Initial Environmental Assessment and the Preliminary Endangerment Assessment. This would include publishing a notice in newspapers of general circulation (including foreign language newspapers if the school district has a sizable number of non-English speaking parents) that includes the following information:

- A statement that a site remediation plans has been submitted to the State environmental agency for approval;

- A brief statement describing the site remediation plan, including a list of contaminants found in excess of regulatory standards and a description of how the plan will reduce the level of contamination to meet those regulatory standards;
- The location where people can review a copy of the remediation plan or an executive summary written in the appropriate local language(s); and
- An announcement of a thirty-day public comment period and the address of the State environmental agency where public comments should be sent.

A copy of this notice shall also be posted in a conspicuous place in every school within the public body's jurisdiction (in multiple languages if there is a significant number of non-English speaking parents). A copy shall also be delivered to each Parent-Teacher Organization within the jurisdiction, to each labor union covered by a collective bargaining agreement signed by the public body, and each landowner within 1,000 feet of the proposed site.

At least thirty days after the conclusion of the public comment period the State environmental regulatory agency shall conduct a public hearing on the remediation plan in the neighborhood or jurisdiction where the proposed site is located.

The State environmental agency shall publish a notice of the hearing in newspapers of general circulation (including foreign language newspapers if the School district has a sizable number of non-English speaking parents) stating the date, time and location of the hearing. The State environmental regulatory agency shall provide translators at the public hearing if the school district has a sizable number of non-English speaking parents.

After the public hearing and after reviewing any comments received during the public comment period the State environmental regulatory agency shall either approve the Site Remediation Plan, disapprove the Site Remediation Plan, or request additional information from the public body. If the State agency requires additional information, a copy of the letter requesting additional information shall be sent to the School Siting Committee. Any additional information submitted by the public body to the State environmental regulatory agency shall also be given to the School Siting Committee. After reviewing any additional information, the State environmental regulatory agency must approve or reject the Site Remediation Plan. The State environmental agency shall explain in detail the reasons for accepting or rejecting the Site Remediation Plan.

After the State environmental regulatory agency approves the Site Remediation Plan, the local School Siting Committee must also review the plan and recommend to the public body whether to abandon the site or proceed with acquiring the site and implementing the remediation plan. Alternative sites or options should be considered at this point. The public body must then vote whether to abandon the site or to acquire the site and implement the remediation plan. Only upon voting to acquire the site and implement the remediation plan may the public body take any action to acquire the site and prepare the site for construction of a school.

4. GUIDELINES APPROPRIATE TO CHILDREN'S HEALTH

The Child Proofing Our Communities campaign believes that the USEPA is best suited to issue such guidelines related to assessment and cleanup of these sites. We feel strongly that Congress should require the EPA to determine proper cleanup guidelines to reduce the risk of exposure for children. It has also been the campaign's experience that the levels of cleanup vary widely from site to site—the determining factor often being the economic status of the particular community. The campaign strongly urges the EPW committee to mandate EPA to establish a minimum standard that all cleanup plans must adhere to. Toward that end we have begun a process of convening a panel of children's environmental health professionals to identify cutting edge health information such as neurodevelopmental and reproductive effects in children that have been associated with exposure to toxic chemicals and to identify how to incorporate this information into the process of setting health based exposure standards for children. The campaign would be pleased to share the results of our investigation with the EPA to inform future efforts in arriving at children's environmental health guidelines.

5. NEW SCHOOL CONSTRUCTION

It makes little sense to build an environmentally dangerous school on a newly cleaned site. We recommend the availability of funds to build healthy "green" schools.

There are no Federal laws governing the environmental health conditions in schools. The EPA has been the most responsive agency, producing tools that individual schools can use to diagnose and correct indoor air quality problems. Much more needs to be done, however, to eliminate the many avoidable environmental

health impacts present in the school environment. A promising Federal bill—the Healthy High Performance Schools Act (2001)—and health and safety grants for emergency school renovations (2000) have had support or funding withdrawn. Thus we are left with the odd result that the Federal Government tolerates unhealthy construction practices and materials usage in schools even as it spends funds to diagnose and correct the resulting problems after the fact.

We advocate the availability of funding for both the aforementioned programs in order to promote “green building” practices in school construction and renovation. Presently there are no national standards that use green building materials and techniques. Some Federal agencies such as the Department of Transportation and the Department of Interior are attempting to utilize the LEED (Leadership in Energy & Environmental Design) program developed by the U.S. Green Building Council. Unfortunately LEED does not effectively address children’s environmental health concerns. As a first step, we recommend that a study of applicable green building standards and policies be undertaken to identify those best serving the goal of protecting children’s health.

6. FEDERAL FUNDING

There is only one State (California), which has a law that provides some siting guidelines. However, there is little funding available to put the legislated guidelines into practice. Therefore, we are advocating for Federal funding of the appropriate agencies to support schools that apply for the assessment, remediation, and construction of “healthy” schools on otherwise untenable sites. Without adequate resources the local school authorities cannot adequately assess the property nor clean the property to a standard that is protective of children.

FINDINGS

- Hundreds of schools nationwide have been built on or near contaminated land
- Taxpayers provide billions of dollars for cleanup, construction of replacement schools, and medical treatment of disease in exposed children

The Child Proofing Our Communities campaign has provided these examples of schools disastrously impacted by their proximity to toxic waste sites:

1. *Love Canal, Niagara Falls, NY—Toxic Waste Dump*

Most know of the Love Canal dumpsite disaster in Niagara Falls. Twenty thousand tons of chemicals were buried in the neighborhood’s center and eventually leaked out into the surrounding community. The 99th Street Elementary School was on the dump’s perimeter, and the 93d Street School was just two blocks away. Both closed in 1978 after extensive testing revealed high levels of chemical contamination on and around them. Love Canal was the first community to close schools due to potential health risks to children.

2. *Los Angeles, CA—Former Oilfield and Industrial Site*

The Belmont Learning Complex was proposed in 1985 by the Los Angeles Unified School District as a middle school to alleviate overcrowding in a mostly poor, Latino neighborhood. The project ballooned into a proposed 35-acre, state-of-the-art, high school campus, with classrooms and innovative “academies” for 5,000 students. More than 15 years later, the half-built brick building stands abandoned. Parents learned what the school district already knew—explosive methane gas, poisonous hydrogen sulfide, volatile organic compounds such as acetone, the carcinogen benzene, and residual crude oil existed on the location, a former oilfield and industrial site.

The project, halted in 2000, is now underway again, with over \$174 million already spent. After extensive debate about children’s health issues, community support for completing the school remains strong. In this instance especially, the contentious process would have been prevented if effective school siting legislation had been in place that emphasized health concerns first and foremost and required assessment and remediation to occur before the expensive construction actually began.

3. *Marion, OH—Military Dump*

The River Valley Middle and High schools sit on the former site of the U.S. Army’s Marion Engineer Depot, and was used as the facility’s dumping ground from 1942–1961. In 1997, community members formed a group, Concerned River Valley Families, in response to alarming rates of leukemia and other rare cancers among former students. The group’s efforts led to an investigation that revealed widespread contamination from toxic materials dumped for nearly two decades. Students were and continue to be exposed to potentially harmful concentrations of solvents, such as trichloroethylene (TCE) and benzo(A)pyrene, polynuclear aromatic hydrocarbons

(PAHs), and heavy metals in the soil surrounding the schools. Many of the solvents are known carcinogens and some have been linked to leukemia.

In November of 2000, River Valley school district Marion voters passed a bond and Congress passed precedent-setting legislation that together would provide enough money to build new schools away from the military dumping grounds. To date, there has been an emergency arsenic removal, and access has been restricted to the polluted athletic fields and the middle school back doors, but air pathways still have not been fully or adequately characterized.

The schools remain open although reservists are not allowed on the adjacent Army Reserve training grounds. The new schools approved by residents and Congress will not be open until at least August 2003, but the school board refuses to temporarily move their students to an environmentally safe facility.

4. Providence, RI—Two New Schools On a Dump, with More Planned

Parents were shocked when bulldozers showed up without warning to begin construction of Springfield Elementary School on the grounds of what had been a city landfill for at least 25 years. The Hartford Park Tenants Association and other community parents have filed a lawsuit against the school board, city of Providence, and State Department of Environmental Management. They argue that building a school for minority students on a landfill is a violation of the children's civil rights. These students already have high rates of asthma and lead poisoning. The groups also contend that they were not given enough notice about the building of the new school to allow them to play a role in the site selection and remediation process.

The groups have concerns about the State-approved soil gas removal process that has placed an elaborate system of monitors and underground pipes beneath the school to prevent the accumulation of explosive methane gas. Their primary concern is the potential for explosion, but they are also worried about the odors coming from the stack that releases soil gases on school property. They want the school shut down.

During the construction of a middle school next to the elementary school, parents won a temporary order halting work while children were outside the elementary school in order to prevent their exposure to contaminated dust. Now that Springfield Middle School has opened, a court has ordered the city to notify the plaintiffs in the lawsuit when environmental testing is done so that plaintiffs' experts can observe the testing. The city must also share the results of the environmental tests with the plaintiffs.

5. Tucson, AZ—Industrial Plants

Sunnyside Elementary and Junior High Schools serve primarily Mexican-Americans in Tucson's Southside. Many who attended during and after the 1950s later developed cancers and leukemia. By 1981, area wells used by these schools and many nearby homes were shut down due to industrial contamination from a groundwater plume of trichloroethylene (TCE) and other toxins migrating from military-related industries. Residents formed Tucsonians for a Clean Environment and won local support for environmental health projects, including a health clinic for persons poisoned by TCE.

Today Tucson's Southside faces a new toxic threat from a military contractor. In 1983, Brush Wellman built a facility near Sunnyside High School, Sierra Middle School, Los Ranchitos, and Los Amigos Elementary Schools. This facility processes beryllium, a lightweight metal the military uses that causes a fatal and incurable lung disease. Twenty-five employees at the plant already have the disease. Beryllium traces have been found on Los Amigos and Los Ranchitos grounds, putting young schoolchildren at risk. The community is asking that Brush Wellman install air monitors on school grounds and around the neighborhood, but they have had no progress thus far.

6. New Orleans, LA—Garbage Dump

Residents of Gordon Plaza—1,000 low-and middle-income African Americans—discovered only after they moved in that they were living on the former Agriculture Street Landfill—the city's municipal waste dump for more than 50 years. The landfill was never properly capped, and residents began almost immediately to dig up trash and building debris in their back yards.

Construction of Moton Elementary School—intended to serve 850 students from Gordon Plaza and a nearby housing project—was completed in 1987 despite residents' concerns about high levels of lead and other toxins at the school site. During the 3 years the school was open, children and staff were sick with rashes, vomiting, respiratory problems, and headaches, and plumbing problems made it impossible to use the school cafeteria and toilets. In 1990, the superintendent overruled the school board and shut the school down.

The U.S. EPA added Agriculture Street to Superfund in 1994 and began a \$20 million cleanup of the site in 1998, replacing two feet of soil while residents remained in their homes, exposed to contaminated dust throughout months of cleanup work.

Moton Elementary School reopened in September of 2001. In some areas on the school grounds, only six inches of soil were replaced. Despite its history, 900 students currently attend the school.

7. Corry, PA—Industrial Plant Emissions

The school board in Corry decided to consolidate four of five small elementary schools into one large school housing over 1,000 students. The chosen site sits next to Foamex, a polyurethane foam manufacturing plant that ranks second statewide for hazardous air emissions, annually dispersing approximately two million pounds of hazardous chemicals into the year. Additionally, toluene diisocyanate (TDI) and methylene chloride are used in the manufacturing process and are stored in large quantities on the site. Both are known carcinogens. Suspected TDI health effects include respiratory, immunological, and neurological disorders. Methylene chloride is suspected of harming the reproductive, neurological and respiratory systems.

The community is unified against the consolidation and has collected 2,000 signatures in support of finding another site. Meanwhile, the consolidation did not occur and the construction of a new school seems doubtful.

8. Jacksonville, FL—Incinerator-Ash Dump

This predominantly African-American community suffers from a long history of industrial contamination. From 1943 to 1969, four sites served as incinerator-ash dumping grounds. The ash contained high levels of lead, dioxins, and PCBs. While environmental agencies knew about the situation as early as 1985, parents and other residents were only informed in 1999.

As the 1999–2000 school year began, many parents, including the president of the PTA, withdrew their children from Mary McLeod Bethune Elementary School, which was built on one site where testing revealed high levels of dioxin. The school was closed in 2001 as part of an EPA-ordered cleanup. Community activists are now pressing for closure and cleanup of a park built on another ash site.

9. Houston, TX—Industrial/Chemical Complex

To relieve overcrowding, the city council created a special taxing district to help cover the \$76 million cost of constructing a new school in a predominantly Latino area. The re-proposed school was opened in 2001 and named for Cesar Chavez. The modern, fully equipped facility with enough computers, laboratories, sport fields, and classrooms for 3,000 students is located in an industrial zone on a site previously occupied by an auto salvage yard, a dry cleaner and a chemical toilet company. The school is a quarter mile from Texas Petrochemicals, Exxon-Mobil, and Goodyear Tire and Rubber, and 1.2 miles from a Lyondell Citgo Refining facility. These plants release nearly five million pounds of hazardous chemicals into the air annually. A major accident at any one of these chemical plants would endanger students at the school. The underground pipelines from the plants that cross the school's property pose an additional threat.

10. Quincy, MA—Shipyards Toxics

Residents from Quincy formed Quincy Citizens for Safe Schools and helped defeat city plans to build a high school on a four-acre site that was contaminated with wastes from a neighboring shipyard. The city knew the site was contaminated with asbestos, lead, PCB's and other chemicals but believed it could be cleaned. When parents and other residents became aware of the plan, they vehemently opposed it and circulated a petition to stop it. Eventually, the mayor and some city council members who had promoted the project were defeated in elections by candidates who opposed the plan.

11. Detroit, Michigan—Former Industrial Site

In July 2000, the Detroit Public Schools (DPS) broke ground on the first new elementary school to be built in the city in decades. Unfortunately, the New Beard School, which would serve the largest concentration of Hispanic students in the city, was sited on a former industrial property contaminated with unsafe levels of lead, arsenic, PCBs, carbon tetrachloride, cyanide, and other toxic materials. Rather than removing these contaminants from the site, DPS chose to install a crushed concrete and soil exposure barrier intended simply to prevent children from touching the contaminated soils.

When initial efforts to convince DPS to listen to their concerns failed, parents filed a civil rights/environmental justice lawsuit to prevent the school from opening

until the site's safety could be demonstrated. After a 4-day evidentiary hearing, a Federal judge allowed the school to open, but required DPS to take additional precautions, which included conducting additional soil and soil gas sampling, hiring an independent environmental consultant (IEC) to make recommendations regarding the need for additional testing and/or monitoring at the site, and establishing a citizens' advisory committee to oversee the IEC's work. DPS has implemented several but not all measures recommended by the IEC, but the Beard administration continues to balk at some precautionary steps, such as installing a permanent plaque at the school warning that about the contamination that lies beneath the exposure barrier.

CONCLUSION

We are truly at a critical juncture. Public elementary and secondary enrollment is rapidly growing and is expected to reach an all-time high of 44.4 million by the year 2006. At least 2,400 more schools are needed in the next few years to accommodate this increase. If action isn't taken immediately, these new schools will continue to be built without guidelines to protect children against chemical exposures. Failure to act could place tens of thousands of children at risk of being exposed to toxic chemicals at their place of learning. Society can no longer allow innocent children to be placed in harm's way due to inexcusably bad decisions by local school district decisionmakers.

Thank you very much for considering our views in the formation of legislation to improve children's environmental health through intelligent and comprehensive school siting.

STATEMENT OF KATIE ACTON, PARENT ADVOCATE, OZONE PARK, NY

To introduce myself, I am Katie Acton, residing at 103-23 105th Street, Ozone Park, Queens, NY 11417. I am married with two daughters, ages 9 and 3. Kaylyn Acton-Chadee, my 9-year-old attended PS 65Q located at 103-22 99th Street, Ozone Park, NY 11417. The principal is Mrs. Iris Nelson and can be reached at (718) 323-1685. The school falls under the NYC Department of Education, District 27, superintended by Mr. Matthew Bromme. Kaylyn was in fourth grade last school year.

In May of 2002, the Queens Forum published an article regarding the possible toxic condition involving a subsurface plume of TriChloroEthylene that is located beneath the school and the immediate environs. Several concerned parents did come together to get answers to the unanswered. Since that time, the NYCDOE has retained external testers to test the quality of air inside the school. The results are doubtful. In July of 2002, further tests were conducted outside the school involving the groundwater and the soil. The results were very alarming in that they were way above the "acceptable" limits.

Other events have happened during this period. PS 65Q was suddenly labeled a "Title I" school and parents were offered to have their children transferred to better performing schools within the district. Those applications were distributed in June 2002. The response was negative for transfers at that time. Transfers were suddenly approved in September 2002, right before school reopened.

The NYCDOE met with parents three times since May 2002, with the last meeting being on 08/29/2002. At the last meeting I attended, Congressman Anthony Weiner was kind enough to appear on our behalf. He raised important issues on the growth of the plume and it was confirmed that the plume is growing and will grow upward. The delegates also indicated that some measures were being taken to clean up the environment. One involved the installation of an air evaporating mechanism to release the pressure buildup below the school.

Another critical issue was the financing of the cleanup. It was disclosed that negotiations were in progress with the Mother Company of the dumpers of the TCE. Why must innocent children and the school public and the community wait on the selfish concerns of others to clean up such a potential hazardous condition. Classes are also held in classrooms located in the basement, whose walls separate the inside from the positive TCE soil on the outside.

Even though Kaylyn is no longer a student there, she was affected. She developed asthma. Since the TCE was unveiled, parents have come together and disclosed that their children have also been suffering from sudden onset asthma and persistent headaches. There have also been some cases of cancer and that a teacher has since passed away from cancer. Her demise was held a secret for 2 weeks until the school population was informed.

I think that the problem is not just restricted to the school alone, but the entire surrounding neighborhood of which the "transferred" parents still reside. It is with

deep sadness that I have to document that the Members of the Board of the Parents Association at PS65 have not been supportive in this matter. Instead of acting as a liaison between the parents and the school authorities, they choose to do otherwise—nothing. My persistence in the matter is one to have the relevant authorities start the cleanup immediately, and the confirmation that our community's children are in a fairly safe environment. We, the residents/parents believe that City and State Agencies need to get involved and do what is ethically and morally correct.

The agencies represented were:

1. NYSDEC—New York State Department of Environmental Conservation
2. NYSDOH—New York State Department of Health, Peter Constantekes; Donn E. Hettrick, Sanitary Engineer 800-458-1158 X 27880
3. NYCHMG—New York City Department of Health and Mental Hygiene
4. NYCDOH—New York City Department of Health, Chris D'Andrea, Industrial Hygienist 212-788-4290; Gary Krigsman MD, DOH Physician for District 27
5. NYCDOE—New York City Department of Education, David Klasfield, Deputy Chancellor of Operations; Bernard Orlan, Director, Environmental Health and Safety

Another representative was Mr. Davis Harrington, Field Engineer. The agency he represented was not clear. He can be reached at 518-402-9564. He was involved on the drilling of the wells for sampling surrounding the school. ATC Associates, Inc. was retained by the NYCDOE to perform the air testing inside the school. Their representatives were present at all three meetings, but did not address the meeting.

MEMORANDUM FROM THE AMERICAN PUBLIC HEALTH ASSOCIATION; BEYOND PESTICIDES; CHILDREN'S ENVIRONMENTAL HEALTH NETWORK; HEALTHY SCHOOLS NETWORK; NATURAL ASSOCIATION OF SCHOOL NURSES; NATURAL RESOURCES DEFENSE COUNCIL; PHYSICIANS FOR SOCIAL RESPONSIBILITY

RASHES AMONG STUDENTS CLOSE SCHOOLS IN MORE THAN 15 STATES

We are writing to urge you to call upon the Centers for Disease Control and Prevention, Center for Environmental Health, to report to you on the procedures and results of its investigation into the outbreak of apparently noncontagious rashes among schoolchildren that have closed schools in more than 15 States. Of particular concern in this investigation are the steps that local investigators took to evaluate the possibility of chemical, physical, or biological agents.

We are especially concerned that this and future investigations of threats to child environmental health and safety at school will be hampered by the lack of baseline data. Thus, we urge you to ask as well on how the Federal agencies participating in the President's Interagency Task Force on the Protection of Children from Environmental Health Risks and Safety Risks would coordinate the development of and implement a plan to monitor pupil illness and injury, as part of the larger national health tracking system. Your support for CDC and other agencies involved in setting up a health tracking system that establishes baseline data and monitors child health is crucial.

Our letter to Centers for Disease Control and Prevention is attached, as is the timely response from CDC.

Thank you for your consideration of this request and for your continuing support of CDC's work, especially since September 11.

For more information: Claire Barnett, Executive Director, Healthy Schools Network, Inc., 773 Madison Avenue, Albany, NY 12208, 518-462-0632.

ATTACHMENT.—LETTER FROM CDC TO COALITION

NATIONAL CENTER FOR ENVIRONMENTAL HEALTH,
March 12, 2002.

CLAIRE L. BARNETT, MBA, *Executive Director*,
Healthy Schools Network, Inc.,
773 Madison Avenue,
Albany, NY.

DEAR MS. BARNETT: Thank you for your email of March 6, 2002 highlighting concerns about the recent reports of rash among school-aged children. It is good to know that Healthy Schools Network and your partner organizations support our efforts to work with State and local health departments, as well as school officials, to determine if the different communities are experiencing a common illness.

As you are already aware, we are committed to continue monitoring reports of rashes among school children. The CDC team is actively working with State and local health and school officials to determine if affected children within and between schools have developed rash as a result of a common etiology. We have colleagues from occupational health, epidemiology, infectious disease as well as environmental health working on this.

We also recognize that State and local health and education departments and schools may have limited resources for investigating the reports of rash illness. CDC has developed and distributed a document with suggested approaches for investigating reports of rash illness among groups of school children, including the importance of having a dermatologist examine these children. As noted in the document, the presence of pesticides and other contaminants should be considered as part of an environmental assessment. State health department personnel are also aware of the availability and willingness of CDC staff to provide onsite assistance, if needed.

With respect to identifying other groups of school children and/or adults with rashes who should be considered as part of the investigations, we were already aware of most of the incidents you identified from your files. For the three situations that we did not know of, we will contact the health department to obtain the relevant information. In addition, we are encouraging State and local health departments to follow-up with individuals who report similar rashes to see if they have a direct or indirect association with affected school children.

Again, I thank you for your support, and for your own efforts to ensure healthy school environments for our nation's children.

Sincerely,

RICHARD J. JACKSON, M.D., M.P.H.,
Director.

ATTACHMENT.—LETTER FROM COALITION TO CDC

March 6, 2002.

RICHARD J. JACKSON, MD, MPH, *Director,*
National Center for Environmental Health,
Centers for Disease Control and Prevention,
4770 Buford Highway, NE (F29),
Atlanta, GA 30341-3724.

Re: School Rashes Report and Recommendations to Congress on Pupil Health Tracking

DEAR DR. JACKSON: We are writing to commend you for your continued commitment to investigate the cause of rashes that have broken out in students in schools in more than 14 States. Scores of schools have been closed, and over 1,000 students and a good number of adults affected. We understand that CDC is conducting its investigation in cooperation with State and local authorities.

We are, however, concerned about the limited resources available to State and communities for these purposes and urge that CDC ensure that the investigations carried out are systematic and comprehensive. To support and ensure the quality of the local investigations, CDC should encourage its own as well as State and local investigators to work directly with local pediatricians and dermatologists.

We also urge that CDC report to Congress, first, on the procedures and findings of the investigation, and, second, on how any future outbreaks can be monitored in a timely fashion.

Because the affected individuals do not present with fevers and their rashes have not spread to family members at home, we also urge you to ensure that special efforts are taken by skilled onsite investigators to consider chemical and physical agents present in affected schools.

There may be other school and community outbreaks involving students that should be included the investigation. A review of Healthy Schools Network's files indicates other cases that could be included are: the Argyle, NY school which had a blistering rash event in the late fall of 2001 affecting two individuals and attributed to an unidentified powder that spilled from an envelope; the Queens, NY school (already reported) to confirm whether the responding paramedics were also affected, as reported by the New York Times, and if so how; the Saxe Gotha Elementary School in South Carolina whose outbreak developed in fall of 2000 and was sustained for 3 months; the Sweetwater County Fair outbreak affecting 30 people in Wyoming, August 2001; and the rashes attributed to "UV radiation" from a broken light fixture in a school gym in North Carolina, reported in October 2001. CDC

should also cooperate with Canadian authorities in Barrie, Ontario to determine if the spring 2001 school rash outbreak was similar.

We understand that the investigation will be hampered by the lack of a national system of tracking pupil health or injury at school, and consequently the lack of any baseline data for comparison. Additionally impeding school investigations are two other factors: no State mandates school nurse staff positions and no State has its own required pupil illness and injury reporting system in place.

Given the unprecedented nature of recent domestic security events, and this outbreak of still unknown causes affecting so many children in so many disparate locations, and the lack of baseline data, we strongly recommend that CDC propose a system to track pupil illness and injury. Baseline information about children's environmental health at school must be developed and a tracking system established so that appropriate and effective prevention and early intervention methods can be devised.

Sincerely,

AMERICAN PUBLIC HEALTH ASSOCIATION,
BEYOND PESTICIDES,
HEALTHY SCHOOLS NETWORK,
NATURAL RESOURCES DEFENSE COUNCIL,
PHYSICIANS FOR SOCIAL RESPONSIBILITY,
NATIONAL ASSOCIATION OF SCHOOL
NURSES.

Vermont

1997—*North Country Union High School*. A student was rushed to the hospital after losing consciousness because of an allergic reaction to poor indoor air quality at the school. In the following months, complaints from staff and from over 76 students followed—citing headaches and gastrointestinal distress.

Between 1973 and 2000, 10 mercury spills occurred within schools in Vermont. The Department removed over 500 pounds of Hg containing wastes from the first 50 schools that signed up for the program.

1998—*Barnet Elementary School*. An odor problem attributed to severe rodent infestation, combined with faulty ventilation, closed a Vermont School.

Virginia

2000—*Walker Upper Elementary School*. A gifted student is tutored at home due to sensitivity to mold and dust at school. Classroom carpeting, moldy ceiling tiles, and poor ventilation are found at the school. Toxic stachybotrys mold is also found in the school.

2001—*Liberty High*. Another Virginia school spends nearly \$400,000 to correct a mold problem, yet acknowledge that residual fungal growth remains.

Apr. 27, 2001—*Jefferson Forest High School*. A school is shut down due to high levels of lead and dioxins found in playground soil. A school nurse, alert to a pattern of health complaints among students presses for air quality testing. A classroom is subsequently closed due to mold contamination.

Rhode Island

2001—*North Smithfield School*. A 3d grade classroom is relocated due to mold growth.

Nov. 2001—*Smithfield Elementary School*. Several dozen school children are suddenly overcome by a stomach illness and sent home. A mold problem at the school is one of the suspected causes.

New York

2001—*Yonkers City School District*. Committed to essential health & safety repairs after calls to HSN from the Asthma Coalition and an onsite visit revealed extraordinary mold contamination.

Mar. 2002—Parents from *Frankfort Schuyler High School*. Found their children exposed to a sudden blowout of construction dust and debris in the cafeteria during lunch. Masks were distributed to staff and teachers but not to students.

Oct. 2001—*Brentwood North Middle School*. Organized a Health and Safety Committee that includes parents resulting in the total remediation of a serious mercury spill. The professional cleaning group did a thorough mercury extraction finding mercury in areas where it was thought none existed, several months after the original spill.

Pennsylvania

May 2002—*East Pennsboro Area School District*. Six children die in a small town. The only common thread is that they all attend the same school complex. Problem underscores the lack of adequate tracking.

May 2002—*Florence School*. A classroom is closed due to stachybotrys contamination.

Apr. 25, 2002—*Freemansburg South School*. A school is closed for an entire year due to mold contamination.

Feb. 2002—*Springford School*. A school is closed due to a mysterious rash outbreak. The rash occurs at school and seems to disappear when the children leave the building.

Oregon

Nov. 2001—*Whittaker Middle School*. A high school and elementary school closed due to mold contamination.

Apr. 15, 2002—*Chapman Elementary School*. An elementary school is closed due to a rash outbreak.

Feb. 11, 2002—*Corvallis Oregon School District*. A school finds that its drinking water is contaminated with unacceptably high lead levels due to old plumbing. Drinking fountains are shut off and bottled water brought in.

Oct. 23, 2001—*Whittaker Middle School*. Teacher Magazine does an exposé on the plight of teachers sickened by a school found to have extremely poor ventilation and mold and radon contamination. Cost of repairs are estimated at \$8.3 million.

Ohio

Aug. 2002—*School for Creative & Performing Arts*. The opening of three schools delayed due to mold contamination.

Feb. 2002—*Batavia Elementary School*. Teachers who worked in a school trailer found to have molds literally “dripping from the ceilings” report on going health problems due to mold exposure.

Oct. 2001—*Central Elementary School*. A school is closed after students are sickened by mold contamination.

Aug. 2001—*Kirk Middle School*. A middle school is closed due to mold and asbestos contamination.

Aug. 2001—*Girard School*. 2000 residents file a complaint calling for the removal and replacement of a school board due to mishandling a mold and poor IAQ problem, leaving students and staff sickened.

New Jersey

Mar. 15, 2002—*Oxford Street Elementary*. Fumes from cleaning solvents used by a custodian to clean graffiti in a classroom sends 39 students and a teacher to the hospital for treatment.

Nevada

Apr. 24, 2002—*Pahrump Valley High*. Stachybotrys contamination closes a school, is found in three others.

Mar. 3, 2002—*Carson City School District*. 5 Modular units contaminated with mold are removed from service.

Feb. 12, 2002—*Spring-Ford Intermediate*. A school is shut down after more than 100 intermediate students develop a rash.

Montana

Feb. 6, 2002—*Seeley Swan High School*. An individual contacts HSN concerned about a gym floor treatment, over 30 years old, that contains mercury.

Apr. 10, 2001—*Osage Beach*. Individual contacts HSN re: Stachybotrys contamination in a school.

Missouri

Aug. 15, 2002—*Kickapoo High School, Springfield*. Students return to school to find the first floor closed due to mold contamination clean-up.

Apr. 23, 2002—*Belvins Elementary, Eureka schools*. 35 children are sent to the hospital, 9 by ambulance after being exposed to a wasp pesticide on the athletic field.

Florida

May 11, 2002—*Trapnell Elementary School*. Mold contamination displaces over 100 elementary school students

Aug. 30, 2001—*Virginia Shuman Young Elementary, Fort Lauderdale*. Students and teachers are sickened by mold contamination in a school, even as it was believed to have been remedied 3 years prior.

Colorado

Feb. 19, 2002—*Littleton Public Schools*. School built on a swampy area. High CO2 levels and mold found. Teachers and students with health complaints.

March 7, 2001—*Sunset School in Cody School District*. Students complaints of sinus problems and watery eyes. Complaints stop when school begins regular maintenance on the HVAC system.

Sept. 2000—Inspectors find unstable chemicals stored in 48 schools around the State.

Connecticut

Feb. 14, 2002—*Connecticut Education Association*. Teachers from across the State testify about their health problems due to poor indoor air quality in schools at a State Legislative Hearing.

Feb. 12, 2002—*McKinnely School in Fairfield*. A teacher's career is ended as she must accept permanent disability due to illness suffered by exposure to molds in her classroom.

California

Feb. 24, 2002—*Agoura Hills Schools* of the Las Virgenes Unified School District battle molds since 1992. Teachers complain of serious illness due to mold contamination at the high school and middle school. Cleanup took place in 1999, however, teachers still find molds and remain ill.

Oct. 23, 2001—*Torrance South High School*. Steps up measures to address a mold problem in light of a union-sponsored survey of 50 teachers. Sixteen teachers suffer from serious sinus infections, respiratory problems, eye irritations or allergies, 15 complain of headaches and stomach ailments and four of the six pregnant teachers last year had miscarriages.

Nov. 5, 2000—*Catskill Elementary School*. In South Los Angeles, *Hamilton Elementary School* in Pasadena-San Marino and *Almonzor Center for Kids with Learning Disabilities* were found by an investigative reporter to be in a school with lead contaminated paint and paint chips on window sill, picnic tables and wooden lattice in the playground with levels from 8 to 31 times the EPA limit.

Dec. 20, 2001—An elementary school in *Santa Barbara County* is evacuated due to a sprinkler application of metam-sodium, prompting an investigation and report by the Cal. Dept. of Health Services.

STATEMENT OF VERONIKA CARELLA, CONCERNED PARENT AND CHILDREN'S ADVOCATE, GLENWOOD, MD

BACKGROUND

Children have the right grow to their full potential, both academically and physically. Children have the right to a free and safe public education. For some families, these goals are growing increasingly difficult and sometimes impossible to obtain, because of the conditions that they face in their school environment. I urge this committee to address the concerns presented today and safeguard our children while they attend school.

I respectfully present testimony as the parent of two children seriously and perhaps permanently injured by exposure to hazardous materials sustained while they attend public schools in Maryland. My children unknowingly became hyper-sensitive to pesticides and some hazardous chemicals due to unintentional exposure at school to EPA-registered pesticides and other hazardous materials when they were young (1995–1998). The resulting injuries have caused them to suffer serious illnesses and miss a significant number of school days. As a family, we struggle with the physical, emotional and economic effects of their conditions everyday since they were exposed to these hidden school environment hazards.

Sadly, ours is not an isolated case. As a children's advocate and active PTA member in the State of Maryland, I have seen, heard, documented and testified to many horror stories from other families who suffer needlessly from harmful products used in their children's school environments.

NEED FOR LEGISLATION

There is no system to protect children. We have personally found that school systems only do what they are legally required to do. Ironically, because of the lack

of legislative protections and funds to adequately maintain our public schools, my children and others continue to be exposed to known hazardous conditions and toxic products in their public schools. The resulting injuries are unnecessary and pose an unacceptable risk to their potential to live full and healthy lives as adults.

Parents are required by law (Maryland) to send their children to public school, yet there is a distinct lack of legislative protection both on the State and Federal level to safeguard children while they are at school. Parents appear to be powerless to protect their children from known hazards in the school setting, thus school environments continue to injure innocent and unsuspecting children and staff.

Every day there is the potential for chemical exposures. Public school students and staff face hidden chemical assaults every day. Children's small growing bodies cannot always process or tolerate the chemicals that we all use in our every day world. This is especially true for certain hazardous pesticides, cleaning products and paints by many school systems. Lower risk alternatives must be made available.

NEED FOR FUNDING

Solutions exist. However, without legislation, schools will not implement them. Without funding schools sometimes cannot implement them. There is a need for legislation and adequate funding to support such solutions such as least-toxic Integrated Pest Management (IPM) where school maintenance and repair reduce and often eliminate the need for chemical pest control methods. Without funding, search cannot continue on identifying low risk alternatives to the products we know have the potential to harm our children.

I strongly encourage you to promptly fund and to implement the Healthy and High Performance Schools Act and strengthen EPA's school environment programs. Thank you for your time and consideration.

STATEMENT OF ROCHELLE DAVIS, EXECUTIVE DIRECTOR, ILLINOIS HEALTHY SCHOOLS CAMPAIGN

Chairman Jeffords and members of the committee, I am Rochelle Davis, Executive Director of the Illinois Healthy Schools Campaign. I would like to thank you for the opportunity to submit a written statement regarding the work the Campaign is doing both in Illinois and nationally.

On behalf of the Illinois Healthy Schools Campaign, I would like to thank Senator Jeffords for convening this important hearing on school environmental health.

The Illinois Healthy Schools Campaign and its 85 endorsing organizations are dedicated to making Illinois schools environmentally healthy places to learn and work.

A review of Illinois laws and regulations by the Environmental Law Clinic found a number of glaring problems:

- There are no standards for school indoor air that have been established to protect children's health. (OSHA has exposure standards; they do not take into account children's vulnerability and apply only to employees.)
- Current inspection programs only cover traditional health, life and safety issues. They do not address indoor air quality (IAQ). Also, current inspection reports are not readily available to the public.
- Except for the Integrated Pest Management in Schools Act, there are no State initiatives promoting best practices for improving school indoor air.

While most of the responsibility to address this problem lies with State and local governments, we believe that the Federal Government can and must play a leadership role on this important issue. More specifically, the Federal Government should:

1. Fund and implement the Healthy and High Performance Schools provisions of the No Child Left Behind Act.
2. Pass the Federal School Environmental Protection Act (SEPA, H.R. 111 and H.R. 3275/S. 1716 in the 106th Congress) that will encourage schools to "pest-proof" their buildings and thus reduce their reliance on the routine use of highly toxic chemicals.
3. Fund school repairs and construction, direct a Federal grant program at high-needs schools, and offer tax credits to subsidize the interest on school construction bonds used for repairs, renovations, and new construction.
4. Fund the Clean School Bus Grant Program which will encourage the use of natural gas and clean diesel power buses.
5. Strengthen the role of Federal agencies (U.S. Environmental Protection Agency, Department of Education, Department of Energy, and National Clearinghouse for Educational Facilities) in promoting Healthy and High Performing Schools.

Since children spend most of their hours outside the home in school buildings, policymakers have a responsibility to ensure that children can attend school in a toxin-free and healthy environment. On behalf of the Illinois Healthy Schools Campaign, I want to thank you for addressing these important issues.

STATEMENT OF TOLLE GRAHAM, COORDINATOR,
MASSACHUSETTS HEALTHY SCHOOLS NETWORK

The Massachusetts Healthy Schools Network is a statewide coalition of parent, education, labor, environment and public health activists working to address poor environmental conditions in schools. Through education, technical assistance and advocacy we have been working on the following initiatives over the last 5 years:

- a. Design, construction and maintenance for healthy schools
- b. Environmental and Indoor Air Quality information clearinghouse
- c. Promotion of "toxic-free" schools
- d. Establishment of school-based "Environmental Teams"

Here are some of the environmental health and safety problems we have identified in our State:

- a. Over 800 schools in Massachusetts are located on or within ½ mile of a hazardous site
- b. School conditions ranking Massachusetts 49th in the Nation on the overall measurement of buildings with at least one inadequate building condition.
- c. Asthma rates among school children reported higher in schools with indoor air quality problems by the Massachusetts Department of Public Health Bureau of Environmental Health Assessment Survey (1999)
- d. Teachers report second highest work-related asthma cases in Massachusetts
- e. Several hundred new schools currently being built that duplicate some of the same poor design features that pose potential environmental siting hazards, IAQ problems and maintenance costs that school districts can't afford.

Three years ago the Mass Healthy Schools Network organized the first statewide conference "Designing, Renovating, and Maintaining our School Buildings" co-sponsored by, the Office of Civil Rights in the U.S. Department of Education, the Massachusetts Public Health Association, the Massachusetts Coalition for Occupational Safety and Health, the Massachusetts Medical Society, the Massachusetts Teachers Association and the U.S. Environmental Protection Agency.

Twenty-two additional health, environment, school related organizations and agencies endorsed it. Conference participants, encouraged to attend as "teams" from their school districts, included school administrators, teachers, parents, health professionals, school committee members, school design committee members, as well as facilities and maintenance staff.

In a follow-up conference survey, close to 50 percent of respondents said they would like to see regulations or laws that require Massachusetts Board of Education School Building Assistance Bureau to include specifications regarding environmental and indoor air quality standards. In addition, they recommended changing the bid process to require all bids to estimate the costs of maintaining the buildings and materials for life cycle cost comparison. Few schools reported even having a written maintenance plan. These responses have been echoed over and over again in all of the activities we've engaged in since that conference.

The Mass Healthy Schools Network has spearheaded some reforms within our State that have the potential for greatly improving school environments and student and staff health. They are:

- a. Won passage of the Childrens' and Family Protection Act requiring integrated pest management plans in schools and school grounds
- b. Adoption of health and safety requirements (SMACNA Guidelines) for schools seeking funds for construction projects from the Massachusetts Department of Education.
- c. 2d State in the Nation which is about to adopt a school environmental siting regulation (public comment period till November 2002).
- d. Developed model regulatory language for healthy high performance schools which are being reviewed by the State Board of Education and the Healthy Schools Council—representing State and Federal agencies that have some authority over schools

Although we feel encouraged by these actions we feel strongly that Federal requirements and funding are both critical to promote national standards for school environmental health and safety. We therefore support the testimony of our National advocates from the Childproofing Our Communities Campaign and the New York Healthy Schools Network and specifically ask you to support:

- a. Requiring the EPA to develop school environmental siting criteria and proper cleanup guidelines to reduce the risk of exposure for children and school staff
- b. Fund and implement the Healthy and High performance Schools provision of the Leave No Child Behind Act
- c. Funding to promote “green building” practices in school construction and renovation.
- d. Reinstate health and safety grants for emergency school renovations (2000)
- e. Expand the EPA’s schools programs which provides “tools” for schools to address their school indoor air and environmental hazards. If committee members wish to get more detailed information about our efforts to improve health and school environmental conditions in Massachusetts, please feel free to contact: Tolle Graham, Healthy Schools Program Coordinator, MassCOSH, 617 825-7233 x19 or Tolle.Graham@masscosh.org

The Healthy Schools Network includes:

Asthma and Allergy Foundation of America, New England Chapter
 Boston Urban Asthma Coalition
 Bowdoin Street Health Center
 MA Association for the Chemically Injured
 MA Coalition for Occupational Safety (MassCOSH)
 MA Parent Teacher Association
 MA Public Health Association
 MA Teachers Association,
 MA Public Interest Research Group (MassPIRG)
 Toxics Action Center
 Western MassCOSH

STATEMENT OF THE HEALTHY SCHOOLS NETWORK, INC., SANITIZERS AND DISINFECTANTS GUIDE

GOOD NEWS.—Sanitizers and disinfectants can play an important role in protecting public health. They are designed to kill “pests,” including infectious germs and other microorganisms such as bacteria, viruses, and fungi.

BAD NEWS.—Unfortunately, Sanitizers and disinfectants also contain chemicals that are “pesticides.” Exposure to persistent toxic chemicals in pesticides can cause serious health problems.

Healthy Schools Network, Inc. (HSN) recommends schools follow all public health laws and regulations regarding the use of sanitizers and disinfectants in schools, and proceed with extreme caution when using any chemicals around children or staff. If the law does not require a chemical use, schools should conduct a thorough analysis of the potential risk of introducing another chemical cleaning product into the school environment. The purpose of this Guide is to provide basic information about the use of sanitizers and disinfectants.

(Underlined words are defined in the Glossary on page 4.)

HOW “TOXIC” IS TOXIC?

A chemical is toxic if it can cause harm to humans or the natural environment. Some chemicals are more harmful, depending on how strong they are, and whether or not they are persistent. The U.S. EPA must register sanitizers and disinfectants before they can be placed on the market for sale. Registration, however, does not assure safety.

CHILDREN ARE AT GREATER RISK

Children are especially vulnerable to toxic chemical exposure. They can be exposed in the following ways:

- Inhalation: Children breathe more air per pound of body weight than adults. Toxic vapors or fumes can cause breathing problems, or be absorbed into the bloodstream.
- Skin contact: Children are less able to identify and avoid hazards, and have immature systems that may not detoxify poisons. Residues from chemicals can damage skin and eyes by burning tissue, or be absorbed through the skin and carried to body organs.
- Ingestion: Children play on the floor or ground, drink or eat chemicals through hand-to-mouth touch, or can lick off a surface, such as a toy or a desktop.

Requirements

- Federal law requires schools to follow all applicable State and local laws and regulations for proper sanitation and health.

- New York State regulations require sanitization of food service areas only. Aside from this, there are no New York laws that require sanitizing or disinfecting in schools. Despite this, some schools apply or misapply sanitizers or disinfectants in other areas in the school building.

- The Federal Occupational Safety and Health Administration (OSHA) Bloodborne Pathogen (BBP) regulations require a special cleanup strategy (including the use of an EPA-registered disinfectant) to protect employees when Hepatitis- or HIV contaminated blood or other bodily fluids may be present. This most often occurs in emergency or first-aid situations. Schools must still follow OSHA/BBP when, for example a fight, playground/sports injury, or illness results in bleeding or vomiting.

Out-of-State readers should check with their own State or local Department of Health for regulations on the use of disinfectants or sanitizers in school.

Common Sense Strategies

- Thorough, routine *frictional cleaning* of surfaces is an extremely effective strategy for protecting building occupant health.

- The maintenance of healthy and safe buildings is a challenge. Before a school goes beyond legal requirements and routinely use sanitizers or disinfectants, these products should be selected carefully and used exactly according to label directions to achieve the best possible results, while protecting people—especially children—from harmful chemical exposure.

Commonly Used Sanitizers and Disinfectants

The following chemicals are the active ingredient in many sanitizers and disinfectants. Some products are sold as concentrates, which can be highly toxic and should be used with extreme caution. The level of toxicity will depend upon how much they are diluted. Some chemicals are persistent, no matter how much they are diluted.

- Phenol Compounds or Carbolic Acid: Used mostly in industrial disinfectant products they are also purchased by schools. Fatal poisoning can occur through skin absorption. Ingestion of small even small amounts may cause vomiting, circulatory collapse, paralysis, convulsions and induce comas. Exposure to vapors or fluids commonly causes light sensitivity and sinus congestion. Skin contact can result in severe burns, skin ulcerations, rashes, swelling, pimples and hives.

- Sodium Hypochlorite—Chlorine Bleach: Used in many disinfectant products, especially those designed to remove mold and mildew. Only a limited number of products registered with the U.S. EPA contain sodium hypochlorite. It is a respiratory irritant and can trigger asthma attacks. Chlorine can burn eyes and skin, and if it is mixed with other cleaners such as ammonia, it will produce a deadly gas. When chlorine mixes with other organic materials, it can produce dioxins and furans—the most toxic chemicals known—which are persistent in the environment and bioaccumulate in living tissue.

- Quaternary Ammonia Compounds—QUATS: When these compounds are properly diluted they are non-staining and non-corrosive to most surfaces. QUATS are irritating to the eyes and skin. Products using 1 percent of certain Quats as their active ingredient are considered toxic to aquatic life.

- Isopropyl alcohol—Isopropanol: This is the most common form of alcohol used for cleaning compounds. It must be at a concentration of 60 to 90 percent to be effective in killing germs. This is a highly flammable chemical and can burn and irritate the eyes. It is moderately toxic to humans by skin contact; drinking or breathing can cause headaches, dizziness, hallucinations, shortness of breath, nausea, vomiting, and coma.

- Pine Oil: This naturally occurring oil derived from pine trees is considered old technology, but it is still used today. As a disinfectant, it is weak, and an 80 percent solution (8 quarts of pine oil to 2 quarts of water) would be needed to kill germs. In its pure form, it can cause eye and skin irritation to eyes and it is moderately flammable.

- Hydrogen Peroxide: Highly concentrated forms of hydrogen peroxide can be irritating to the eyes and skin. Hydrogen peroxide is a sanitizer found in cleaning products that also contain detergents and other ingredients such as citrus oils because they effectively clean soiled surfaces. (*The hydrogen peroxide sold in drug stores as an antiseptic should not be used as a cleaning product.*)

GERM REDUCTION AND PESTICIDE EXPOSURE PREVENTION CHECKLIST

1. *Prevention:*

- Keep dirt out of the building and under control.
- Clean often and carefully.
- Encourage frequent handwashing among students and staff.

2. *Think carefully before using a disinfectant product:*

- Evaluate areas most often touched by people.
- *Thoroughly clean* these surfaces to remove dirt, spills, finger marks, etc.
- Re-evaluate the need to sanitize or disinfect: *cleaning may be sufficient*.
- If you choose to use a toxic product, follow the directions on the label exactly (see #3 below).

- Do not use toxic products when children are present.
- Remember: a surface must be thoroughly cleaned *before* a sanitizer or disinfectant is applied, otherwise the product may not be fully effective. Allow time for the sanitizer or disinfectant to react—make sure it is used when people will not be using the surface until the reaction has occurred and the toxins have dissipated.
- Make sure the area is well ventilated while the product is being used and before the area is reoccupied, especially by children.

3. *Read labels, check Materials Safety Data Sheets (MSDS) and ask:*

- What is the “active ingredient?”
- Is it designed to kill the target germs or other organisms?
- Is there a safer alternative that will do the job with minimal risk of toxic exposure?
- Has the staff been trained to use the product in a manner that is protective of children?
- Will it damage the surfaces cleaned with it?

4. *Other tips:*

- If using a product from concentrate, make sure it is diluted properly. Measure accurately and use proper equipment.
- Use the smallest amount of the product possible to achieve the intended result.
- Sanitizers and disinfectants should be stored safely and disposed of in an environmentally safe manner.

GLOSSARY

Microbes—Microorganisms such as bacteria, germs and viruses.

Active Ingredient—The ingredient that kills the target organism.

Toxic—Refers to chemicals that can cause harm to humans or animals.

Hazardous—Refers to chemicals that are dangerous.

MSDS—Material Safety Data Sheets are the manufacturer’s summary of the potential hazards of a product. They include information on health effects, safe use, handling and storage, etc. For more information on MSDS, call the Healthy Schools Network.

Disinfectant—A product designed to kill microbes.

Sanitizer—A product designed to reduce the amount of microbes.

Sterilizer—A product designed to kill all microbes; for example, in a hospital.

Frictional Cleaning—Cleaning while rubbing vigorously.

Persistent Toxic Chemical—A chemical that remains in the environment and causes harm to humans and animals.

USEPA—United States Environmental Protection Agency.

SOURCES AND RESOURCES

- Healthy Schools Network, Inc. Healthier Cleaning and Maintenance Practices and Products for Schools. 518 462-0632 or <http://www.healthyschools.org>. Contains a step-by-step process and checklists for healthier practices and products.

- Thomas Barron, Carol Berg, Linda Bookman, Janitorial Products Pollution Prevention Project, sponsored by USEPA, Region 9, <http://www.westp2net.org>.

- US Environmental Protection Agency, <http://www.epa.gov/pesticides>.

- Minnesota Technical Assistance Program, University of Minnesota, <http://www.mtap.umn.edu>

- Ted Schettler, MD, MPH, Jill Stein, MD, Fay Reich, PsyD, Maria Valenti, David Wallinga, MD, In Harm’s Way: Toxic Threats to Child Development, Greater Boston Physicians for Social Responsibility, 11 Garden Street, Cambridge, MA 02138, <http://www.igc.org/psr/>

School Buildings
[School Building Conditions]

State	School Building Condition (*/-) *								Enrollment Growth** 1996-2000
	A	B	C	D	E	F	G	H	
Alabama	59	39	63	30	22	38	26	34	91,000
Alaska	69	45	80	33	39	33	52	45	16,000
Arizona	64	41	69	30	20	40	30	28	51,000
Arkansas	42	25	62	22	8	22	12	20	11,000
California	71	43	87	40	25	41	29	56	1,064,000
Colorado	58	32	63	26	29	28	37	33	40,000
Connecticut	58	30	68	32	24	25	35	41	8,000
Delaware	70	40	65	36	26	50	30	49	9,000
District of Columbia	91	49	73	67	31	65	34	41	15,000
Florida	57	31	80	23	18	32	35	42	98,000
Georgia	37	26	48	24	12	18	12	38	113,000
Hawaii	57	21	78	16	—	20	26	61	24,000
Idaho	56	32	64	31	20	32	36	37	25,000
Illinois	62	31	70	23	21	38	29	41	76,000
Indiana	56	29	67	15	21	29	29	32	47,000
Iowa	50	19	67	7	11	21	24	15	n/a
Kansas	55	38	74	28	22	32	35	37	4,000
Kentucky	59	31	63	34	18	24	26	25	8,000
Louisiana	50	39	66	28	18	25	7	39	9,000
Maine	60	38	71	38	20	30	29	35	11,000
Maryland	67	31	65	33	19	26	29	36	93,000
Massachusetts	75	41	80	41	33	36	42	49	195,000
Michigan	52	22	61	20	17	22	25	38	49,000
Minnesota	57	38	66	62	15	33	36	25	32,000
Mississippi	50	28	54	27	11	28	9	20	3,000
Missouri	48	27	58	20	10	30	13	26	61,000
Montana	45	20	69	19	9	19	21	25	2,000
Nebraska	44	35	61	20	17	24	33	21	9,000
Nevada	42	23	57	18	21	16	23	25	24,000
New Hampshire	59	38	78	20	25	28	47	35	31,000
New Jersey	53	19	69	25	10	20	22	34	109,000
New Mexico	69	30	75	29	24	43	33	42	30,000
New York	67	33	76	31	21	28	36	35	36,000
North Carolina	55	36	68	25	14	22	23	42	110,000
North Dakota	49	23	62	19	20	28	29	18	n/a
Ohio	76	38	83	33	25	39	33	51	111,000
Oklahoma	54	30	64	26	19	32	21	32	38,000
Oregon	63	39	84	36	27	41	40	34	62,000
Pennsylvania	42	21	57	19	17	20	23	17	160,000
Rhode Island	61	29	75	23	26	27	29	45	25,000
South Carolina	52	37	66	28	13	28	26	33	48,000
South Dakota	45	21	50	26	15	25	26	15	n/a
Tennessee	56	27	64	22	17	21	19	25	40,000
Texas	46	27	60	23	14	26	16	22	298,000
Utah	62	34	72	32	22	33	34	27	47,000
Vermont	53	21	58	21	23	19	32	26	5,000
Virginia	60	27	58	32	17	32	22	29	110,000
Washington	60	44	74	32	30	39	42	35	133,000
West Virginia	67	42	82	26	34	28	46	18	n/a
Wisconsin	49	33	60	18	14	24	20	33	19,000
Wyoming	49	24	68	24	11	19	24	16	6,000

* Source: School Facilities, Profiles of School Conditions by State, U.S. General Accounting Office, 1996.

** Projected enrollment growth, 1996-2006. Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data Surveys.

A—At least one inadequate building feature (roofs, framing, floors, foundations, exterior walls finishes, windows, doors, interior finishes and trims, plumbing, heating, ventilation, air conditioning, electrical power, electrical lighting and life-safety codes).

B—At least one building needing extensive repair or replacement.

C—At least one unsatisfactory environmental condition.

D—Crumbling roofs.

E—Inadequate plumbing.

F—Bad plumbing.

G—Poor ventilation.

H—Lacking enough power outlets and wiring to accommodate computers and multimedia equipment in classroom.

October 4, 2002.

Mr. JOEL KLEIN, *Chancellor,*
NYC Dept. of Education,
110 Livingston Street,
Brooklyn, NY.

Re: The quality of indoor air at PS65Q, and the toxicity of TriChloroEthylene that lies beneath the premises

DEAR MR. KLEIN: I turn your attention to the attached material that refers to the captioned subject. This letter comes to you and your good office after I have observed you on the television media making specific comments on your stance with NYC's children, viz., "children come first."

The situation at PS65Q has evolved into one with many confusing matters and has left parents doubtful and insulted. As the letter indicates, the TCE presence was uncovered since May of 2002, with the relevant DOE officials implementing the necessary steps to have the indoor air and the subsoil tested for the contaminant. The DOE had three meetings (to date 08/29/02) with parents indicating that the school was safe. At the meeting in June 2002, it was revealed that the air in the basement classrooms contained high levels of carbon dioxide, which is expected, as the basement rooms have no ventilation. My daughter has been in two classrooms with no ventilation. In the third grade she was in a cramped room with no windows, and in the fourth grade she was in a basement classroom, again with no windows. She has since developed asthma since attending PS 65Q. There are other children in the school who have been sick, the statistics of which your office investigated and determined that it compares with that in other Queens schools. The actual documentation of the illnesses cannot be trusted due to the unapproachability of the medical staff at the school. This is not an accusation, but a mere feedback from the children.

In tests conducted in July 2002, in the subsoil airspaces, TCE was present. At the meeting in August 2002 those results were disclosed. At that meeting, Congressman Anthony Weiner was present and raised questions regarding the plume of TCE. The experts from NYCDOH indicated that the plume is growing and can grow upward. The most important question asked was relating to the cleanup of the TCE and what has been done so far. At that time, the NYCDOE was in negotiation with Ozone Industries to agree on the financial part of the cleanup. The NYCDOE was supposed to also install some air evaporators to assist in the ventilation. Further to that time, I am uninformed as my daughter was transferred to PS62Q.

This brings me to another confusing matter. At the end of the last school year, the parents suddenly received application forms for transfers for students because PS65Q was now a "Title I" school. This was unknown until that time. Prior to that event, at one of the meetings, the Superintendent for District 27, Mr. Bromme, indicated that we could call the district office and request transfers for children if the parents wanted their children out of PS65Q. Many parents, of course, jumped at that offer, only to find out that the options were indeed very far away. I requested a transfer to PS62Q and was denied because there were no seats, yet under the Title I transfer, there were. That needs explaining.

Another concept that needs explaining is the meaning of "Title I" and what broad parameters need to be satisfied for this to be labeled. I have been told that it relates to the overall lowered academic performance of the school on a whole and that it needs improvement. The school administration has conveyed that "Title I," relates to the financial status of the parents of the children who attend and the fact that the children receive free breakfasts and lunches. How does this now connect to The No Child Left Behind Act?

Whatever the policies of the NYCDOE mandate for standards is not questionable, but rather the people therein who enforce such mandates. The communicating part of your department needs to be versed in such issues before they can convey it to the parent population, some of who are not highly educated as they. The explanations given by the district and the school are different.

Your views on these issues are sought, as well as the agenda for the cleanup, which now affects the community.

Respectfully,

KATIE ACTON,
Parent / Resident.

STATEMENT OF PHILIP J. LANDRIGAN, M.D., M.Sc., ETHEL H. WISE PROFESSOR AND CHAIR, DEPARTMENT OF COMMUNITY AND PREVENTIVE MEDICINE, PROFESSOR OF PEDIATRICS, DIRECTOR, CENTER FOR CHILDREN'S HEALTH AND THE ENVIRONMENT, MOUNT SINAI SCHOOL OF MEDICINE, NEW YORK, NY

Mr. Chairman and members of the committee: my name is Philip J. Landrigan, MD. I am a pediatrician, Chairman of the Department of Community and Preventive Medicine and Director of the Center for Children's Health and the Environment of the Mount Sinai School of Medicine in New York City. A copy of my curriculum vitae is attached to my testimony.

I will focus my testimony on environmental threats to children's health in America's schools.

INTRODUCTION

School is a place where children spend 5 to 8 hours per day, 5 days each week for 12 or more years of their lives. For our nation's future, it is essential that schools provide our children a sound education and prepare them for future citizenship. It is also essential that our nation's schools provide a safe haven for our children and contain an environment that is free from threats to children's health.

Unfortunately, schools are not always free from environmental hazards. Pesticides, lead, and asbestos are three classes of hazardous chemical that have been found in America's schools. These are chemicals that can cause disease, acute as well as chronic. They can interfere with children's learning.

Fortunately, there exist well-studied, and proven techniques for dealing with these environmental hazards in schools and for minimizing the threats they pose to our children's health. I shall review this information in my testimony.

CHILDREN'S VULNERABILITY TO ENVIRONMENTAL TOXINS

Children are especially sensitive to environmental toxins. Pound for pound of body weight, children have greater exposure to pesticides because they drink more water, eat more food and breathe more air than adults. Two additional characteristics of children further magnify their exposures: (1) they live and play close to the floor; and (2) they constantly put their fingers into their mouths. Children's metabolic pathways, especially in the first months after birth are immature. Generally they are less well able to metabolize, detoxify, and excrete toxicants than adults and thus are more vulnerable to them. Children are undergoing rapid growth and development, and their developmental processes are easily disrupted. Since children have more future years of life than most adults, they have more time to develop chronic diseases that may be triggered by early exposures.

Pesticides

The Problem. Schools, with their cafeterias and lunches stored in lockers, provide an ideal indoor habitat for pests. According to cooperative extension services, common insects that inhabit school buildings include cockroaches, bees, wasps, ants, flies as well as rodents and birds.

Pesticides are widely used in schools to combat these pests. Pesticides are a diverse group of chemical compounds and they are among the classes of toxic chemicals most commonly encountered by children. Pesticides include insecticides, fungicides, herbicides, and rodenticides.

Pesticides have been shown to cause injury to human health, as well as damage the environment. The health effects include acute and persistent injury to the nervous system, lung damage, injury to the reproductive organs, dysfunction of the immune and endocrine systems, birth defects, and cancer. The principal classes of insecticides in use in the United States are the organophosphates, carbamates, and pyrethroids. The organophosphates and carbamates are toxic to the nervous system and some of the pyrethroids are believed to be toxic to the reproductive system and disruptive to endocrine function.

A recent survey by Connecticut environmental researchers showed that schools in 13 of the 16 school districts in Connecticut were treated with pesticides on a monthly basis, even though they may not have needed it. Surveys in other States have similarly shown that 85 to 90 percent of school districts routinely apply pesticides, whether or not there is evidence of need. Pesticides used indoors included bendiocarb, chlorpyrifos, cyfluthrin, cypermethrin, pyrethrin, piperonyl butoxide, tralomethrin, and bromadiolone. In addition, seven school districts in Connecticut reported that townships were responsible for maintaining the athletic fields used by the schools; of these, 53 percent used herbicides, some of them known carcinogens.

The effects of pesticide poisoning on children can be acute and obvious, or chronic, cumulative, and subtle. The Consumer Product Safety Commission collects data on

acute pesticide poisonings in the United States, based on statistical sample of emergency rooms in 6,000 selected hospitals. From 1990 to 1992, an estimated 20,000 emergency room visits were the result of pesticide exposure. The incidence was disproportionately high among children, who accounted for 61 percent or more than 12,000 of these cases. Organophosphates were the class of compounds most frequently involved.

Acute high-dose exposure to organophosphate pesticides inhibits the enzyme acetylcholinesterase in the nervous system, leading to a spectrum of cholinergic symptoms, including lacrimation, abdominal cramps, vomiting, diarrhea, miosis, and profuse sweating. The more severe cases progress to respiratory arrest and death. Studies in animals indicate that the young are more susceptible than adults to this acute neurotoxic syndrome, probably because the young are less able to detoxify and excrete organophosphates.

Concern about the chronic effects of pesticides focuses on two particular areas: subclinical neurotoxicity and disruption of endocrine function. The notion of the possible "subclinical toxicity" of pesticides has gained increasing attention in recent years. This term denotes the idea that relatively low-dose exposure to certain chemicals, pesticides among them, may harm various organ systems without producing acute symptoms or being evident in a standard clinical examination. The concept arose from studies of children exposed to relatively low levels of lead who were found to have suffered loss of intelligence and altered behavior even in the absence of clinically detectable symptoms. The underlying premise is that there exists a continuum of toxicity in which clinically apparent effects have asymptomatic, subclinical counterparts. It is important to note that these subclinical changes represent truly harmful outcomes and are not merely homeostatic or physiological "adjustments" to the presence of pesticides.

Recent findings on the developmental toxicity of chlorpyrifos in animals illustrate the potential of pesticides to produce subclinical neurotoxicity in infants and children. The mechanism of chlorpyrifos-induced neurotoxicity appears to involve injury to the adenylyl cyclase cascade, a system in brain cells that mediates cholinergic as well as adrenergic signals. Even at low doses of exposure, insufficient to compromise survival or growth, chlorpyrifos was found to "produce cellular deficits in the developing brain that could contribute to behavioral abnormalities."

Because these animal data are so recent, studies of the developmental toxicity of chlorpyrifos in human infants have not yet been conducted. However, the animal data raise the concern that chlorpyrifos may not be the only organophosphate pesticide that could be a developmental toxicant in humans. The potential for such toxicity may be substantial in urban communities, where chlorpyrifos is heavily applied in closed apartments.

On the basis of these findings, the EPA recently issued a ruling that bans the use of chlorpyrifos in schools, parks, and day-care settings and that prohibits and phases out nearly all residential use. Preventing developmental disability in children was the major reason for this ruling. But many other similar organophosphate remain on the market and are used in schools.

The potential of pesticides to disrupt endocrine function has been recognized for nearly four decades, ever since the 1962 publication of Rachel Carson's *Silent Spring*. Carson's work showed that eagles and ospreys who had been heavily exposed to DDT had suffered disrupted estrogen cycles. As a result, these two predatory species at the top of the food chain were producing thin-shelled, nonviable eggs. Carson's work, along with the desire to prevent the bald eagle from becoming extinct, prompted the EPA to ban DDT in the early 1970s.

Recent concern about the endocrine toxicity of pesticides in humans has focused especially on the pyrethroids, a class of insecticides widely used as substitutes for chlorpyrifos and other organophosphate and carbamate pesticides. Pyrethroids have been used in pediatric practice to control body lice and scabies instead of more toxic agents such as lindane, and their acute toxicity is generally low. However, hormonal activity has been reported for certain pyrethroids in laboratory systems, suggesting that their capacity to affect hormonal and reproductive development in children should be investigated further.

The Solution. The control of pests in schools does not require heavy, preventive sprayings of toxic pesticides that can be harmful to children. The approach to pest management that is preferred by public health professionals is Integrated Pest Management (IPM). This concept calls for an approach that relies on a thorough knowledge of each pest and use of least-toxic, common-sense methods of keeping pests under control. The best, least-toxic way to control pests is to prevent them from ever infesting an area in the first place—make sure they cannot get in, deny them access to food and water, and make the building uninhabitable. The IPM approach to cockroach control begins with eliminating the things that are attractive

to them: take away their water sources by repairing leaky pipes and faucets, and treat areas that have condensation on them; wipe out their travel plans by repairing cracks and crevices with caulk; and take away their food sources by cleaning countertops and cooking surfaces. In IPM, chemical pesticides are used only as the strategy of last resort. I highly recommend that school districts contact their local cooperative extension program to see if they have IPM advice for pests in the district's region.

A legislative approach that has proven successful in several States in reducing children's pesticides exposures in schools is a legally mandated requirement that school districts provide parents advance notification of any planned application of pesticides. This approach has been adopted into law in Connecticut. Another sensible approach would be to develop a list of the most toxic pesticides and ban them from school premises.

Lead Paint

The Problem. Lead is a toxic metal that can damage the kidneys, heart, and gastrointestinal system and can lead to brain damage in children. Granted, severe cases of lead poisoning have become less common in this country as medical treatment and efforts at prevention have become more sophisticated. However, we still need to be concerned because even low levels of lead can damage the developing brain and nervous system of a child. Studies have shown that children with even small amounts of lead in their blood have more difficulty learning and have lower intelligence quotients (IQ) than children without lead in their blood. In addition to affecting intelligence, lead poisoning may also cause behavioral problems, including a shortened attention span. The effects of lead poisoning (which are permanent) can occur silently and may often cause no symptoms.

The Solution. If lead paint is present, schools should call their local or State health department to find out what steps need to be taken to insure that children are not at risk for lead poisoning. Even if lead paint is not chipping or peeling, it can still pose a risk to children.

Lead in Drinking Water

The Problem. In many older schools, drinking water is contaminated by lead because these schools have lead pipes in their plumbing. Some schools also have lead solder in their plumbing (lead solder was banned from use by the Federal Government in 1986). When water sits in contact with lead pipes or lead solder overnight, over a weekend, or during school vacations, it is possible for lead from the plumbing system to leach into the drinking water. Lead has also been found in some types of water fountains. Since childhood lead poisoning results from a child's cumulative exposure to lead from many sources in the environment, it is important to eliminate lead from every possible source in the environment, including water.

The Solution. The EPA has published guidelines to prevent lead poisoning. Under these guidelines, schools are required to test their water in a prescribed fashion and in accordance with EPA guidelines. If lead is detected in the water, the source must be identified and removed.

Asbestos in Schools

The Problem. Asbestos is a mineral that has been used in schools for heat insulation and for acoustic purposes. Since the 1920s, billions of tons of asbestos have been used in homes, schools, and public buildings in the United States. The heaviest use of asbestos occurred in buildings built in the 1950s and 1960s. In the 1970s, the use of asbestos rapidly declined as the health hazards of asbestos became better known. Such hazards include lung cancer and malignant mesothelioma (a cancer of the chest and abdomen lining). These cancers occur years after inhaling asbestos fibers. Lung cancer can occur 10 to 30 years after exposure to asbestos fibers, while mesothelioma generally occur 20 to 50 years after exposure.

The Solution. If asbestos is in poor condition, with apparent flaking and friability, it needs to be removed by a licensed, certified asbestos removal expert. If the asbestos is in good condition, with no flaking or cracking, it is better to leave it alone, and a commonly used approach is to put physical barriers between it and children, while continuing to monitor its condition on a regular basis. Under the EPA's Asbestos Hazard Emergency Response Act (AHERA), schools are inspected and asbestos removed, according to carefully developed regulations.

Conclusion

Our children are our future. Our responsibility as the elder members of our society is to care for our children, protect their health, and guide them to successful adulthood.

The protection of children against toxic chemicals in the environment poses a major challenge to modern society. Hundreds of new chemicals are developed every year and released into the environment, and many of these chemicals are untested for their toxic effects on children. Thus, the extent of children's exposures to environmental chemicals will almost certainly continue to increase. The problem is not going away. The challenge, therefore, is to design policies that will protect children against environmental toxins and will allow our children to grow, develop, and reach maturity without incurring neurologic impairment, immune dysfunction, reproductive damage, or increased risk of cancer as a consequence of toxic environmental exposures.

The hearing that you have convened today represents a spectacular opportunity to build policies that will meet this challenge. I commend you on having convened the hearing.

STATEMENT OF SUSANNE MILLER,
VERMONT PUBLIC INTEREST RESEARCH GROUP (VPIRG)

Good morning, Chairman and members of the Environment and Public Works Committee. Please accept my testimony from the Vermont Public Interest Research Group (VPIRG) regarding healthy schools in Vermont for today's hearing on "Green Schools."

Currently, many Vermont schools have environmental health problems that pose health risks to children and staff. For many years now, VPIRG has worked to rid schools in Vermont of environmental hazards and reduce the possibility of children being exposed to harmful chemicals while at school. A few examples of environmental hazards include poor indoor air quality from old ventilation and heating systems, the buildup of unhealthy molds, routine application of pesticides within (and outside) many Vermont schools, and the use of harmful chemicals found in certain cleaning fluids and solvents, school laboratories, and art supplies.

In 1998 VPIRG conducted a survey of Vermont schools to determine the extent of chemicals found in the classroom. We learned that 75 percent of schools surveyed used pesticides on a monthly basis, while 88 percent of those surveyed used maintenance products containing chemicals linked to negative health effects. Headaches, respiratory problems, stomach aches, and behavioral and learning disabilities are all common symptoms of environmental health exposures.

While the survey was conducted, a student in Newport Vermont was rushed to the hospital after losing consciousness because of poor air quality found at North Country Union High School. The school was found to have elevated levels of benzene, styrene, and carbon monoxide, and air circulation within the school was poor. Multiple complaints followed from staff, and at least 76 students cited headaches and stomach problems. At first, the school administration was very reluctant to acknowledge that there was a problem with indoor air quality, but after the threat of a "sick building syndrome" lawsuit from staff, and heightened community activism, the school agreed to look into the issue. Shortly thereafter with the help of the community and some EPA funding, the school revamped its ventilation system and drastically improved the air quality in the buildings, creating a much safer environment.

The North Country Union High School is not an isolated case of air quality hazards in Vermont's schools. In fact, the State legislature recognized that there could be serious health consequences from environmental hazards and passed a law in 2000 known as the "School Environmental Health Act," or Act 125. The law requires the Vermont State Department of Health to create a voluntary program for all schools that will reduce harmful exposures to chemicals, and lead to improved environmental health conditions in schools.

Although the intent behind the law was clear in that it was to improve school environmental health, unfortunately the implementation of this law has been dismal. There are three reasons why this law has not yet improved environmental health at a single school since 2000. First there is inadequate funding and resources available for implementation of an effective statewide program. Second, there is strong reluctance from many school administrators in recognizing that indoor air quality and environmental conditions at schools can relate to or cause serious health problems among students and staff. Third, the act does not require Vermont's schools to actually take steps toward making buildings and facilities safer. This act is not well designed to protect children.

Since the law's inception, VPIRG has worked hard with State officials to further the implementation of Act 125. Sadly, the lack of funding and of public awareness has significantly delayed the improvement of environmental health in Vermont's

Schools. Vermont desperately needs Federal assistance with funding and with resources to make its schools and buildings greener and safer for children.

VPIRG is currently conducting a new survey with the University of Vermont, and the Vermont Department of Education to determine the extent of pesticide use within and outside of Vermont's schools and buildings. Many States require advanced notification to parents when pesticides are applied at school, and the use of integrated pest management policies in schools. Integrated pest management policies, and pest-proofing of schools is a highly cost effective way for our schools to improve their infrastructure and to reduce the use of toxic chemicals. Vermont's schools lack these requirements, and so far many completed surveys are showing that schools are not engaging in integrated pest management, are potentially exposing children to pesticides at school, and are not warning parents of pending applications. Nor are they taking appropriate steps to pest-proof their buildings and facilities.

Although this survey only focuses on pesticide use at schools, we strongly believe that poor air quality, mold outbreaks, and other chemical toxic exposures are likely to be found throughout Vermont's schools. Not implementing Act 125 and not having Federal funds or legislation to promote environmental health at schools puts all Vermont's children at risk. We ask for your assistance in making school buildings and grounds in Vermont, and around the U.S. safer.

Specifically, we are asking for:

- The funding and implementation of the Healthy and High Performance Schools provisions of the "Leave no Child Behind Act"—which will allow the U.S. Department of Education to research the links between environmental hazards at schools and children's health and learning and establish State-based programs for greener schools.
- Expansion of the U.S. EPA's schools programs to improve indoor air quality.
- Passage of the Federal School Environmental Protection Act (SEPA) which would make schools "pest-proof" and would reduce the necessity for routine reliance on pesticide use.

Thank you for your consideration of this matter, and for the opportunity to voice concern about school environmental health in Vermont. If I can be of any further assistance to your committee I would be happy to provide more information.

STATEMENT OF DANIEL SWARTZ, EXECUTIVE DIRECTOR,
CHILDREN'S ENVIRONMENTAL HEALTH NETWORK

The Children's Environmental Health Network commends this committee for bringing attention to the issue of children's environmental health and the important relationship between children's health and the school environment.

We appreciate the opportunity to submit this testimony for the record. The Children's Environmental Health Network is a non-partisan and multi-disciplinary national project whose mission is to protect the fetus and the child from environmental hazards and to promote a healthy environment. The Network's Board of Directors and committee members include numerous experts in children's environmental health who serve on key Federal advisory panels and scientific boards.

The last few years have seen a dramatic increase in awareness of the simple fact that children may be harmed by a wide range of environmental toxicants—often in ways quite dissimilar to adults. Yet much more needs to be done in educating the public, changing behavior, amending our policies, and gaining more information if we are to meet the challenge of providing a healthy environment and protecting our children from environmental risk.

In my testimony, I'd like to highlight a few of the basic medical and scientific concepts that form the foundation for this field and outline how our policies relating to school facilities can better recognize these concepts.

A fundamental maxim of pediatric medicine is that children are not "little adults." What does this mean when we talk about children and environmental toxicants? Scientists have documented the many differences between adult and child behavior and exposures; often these differences lead to higher exposures for children. The medical evidence is unassailable that every child experiences particular windows of vulnerability from conception through adolescence. In brief, children can be more susceptible to harm caused by environmental agents. Exposures that for an adult may have little or no consequence can result in life-long harm for a child.

There is clear, sound science underlying these principles. There is a solid consensus in the scientific community for these concepts. As additional scientific knowledge in this field expands, it continues to reinforce this foundation. I am attaching materials on these points developed by the Network for additional background (Attachment 1).

If we take these principles and apply them to the school environment, these are the types of pediatric, scientific and public health concepts that should be shaping the policies and activities of our educational institutions:

- Children deserve a safe and healthy school environment, including protection from harmful environmental exposures.
- Every child experiences particular windows of vulnerability from conception through adolescence. Exposure at those moments of vulnerability to environmental hazards can lead to permanent and irreversible damage.
- These windows of vulnerability do not exist for adults, so standards based on effects on mature systems will not take into account children's vulnerabilities.
- Children's exposures to environmental toxicants are not the same as adult exposures; exposure estimates based on adult exposures are likely to understate children's exposures.
- Past practices which do not take children's vulnerabilities and exposures into account cannot be assumed to be protective of children's health.
- Parents and other caregivers deserve to know what their children are exposed to in school facilities and the impact of such exposures.
- Research, data collection and other components of public health infrastructure must be in place to identify and correct existing problems and to prevent potential environmental problems in school facilities and children and their caregivers should have access to these resources.

However, in most cases our educational facilities are not guided by these concepts. Children spend hours every day in and around their school. Chemical toxicants and biological agents in the classroom, on the playground, in the science lab, or in other school facilities can lead to health risks and adverse learning conditions. They can affect many different body systems and impact health, learning, productivity, and self esteem. Yet few steps have been taken to protect children from environmental toxicants in the school environment. I am also attaching to this testimony a summary of the health effects and toxicants of greatest concern in the school environment. (Attachment 2)

LEADERSHIP THROUGH POLICY

We join with other witnesses testifying today commending the Senate for its leadership in passing such important initiatives as the Healthy and High Performance Schools provisions in H.R. 1/P.L. 107-110, the "No Child Left Behind Act of 2001" and the "School Environment Protection Act."

Under the Healthy and High Performance Schools program:

- The Department of Education is directed to undertake a study of "unhealthy public school buildings" and their health and learning impacts.
- A joint Department of Education-Department of Energy-Environmental Protection Agency grant program was created to award grants to State and local educational agencies to support healthy and high performance school buildings.
- The Department of Education is to biennially report to Congress on this program.

The Network was delighted at the enactment of these provisions. We strongly urge their full implementation, and expect these measures to receive the strong support of both Congress and the Administration. The Department of Education must provide funding and implementation of these provisions. The Department must also be a full participant in activities such as the Interagency Task Force on Children's Environmental Health and Safety and the National Children's Study.

Though the Network and others were heartened by the Senate's decision to—twice—adopt the "School Environment Protection Act," we were doubly disappointed by the House's decisions not to accept these important provisions on the education bill and the farm bill.

Many school districts around the Nation have implemented integrated pest management (IPM) programs to minimize the use of pesticides and have instituted processes to provide advance notice of pesticide use in schools to parents and employees. The "School Environment Protection Act" would further encourage schools to adopt IPM programs and would provide a valuable tool for parents.

ADDITIONAL STEPS

These efforts are vital, but additional efforts are needed, such as research into the relationship between environmental hazards at school and their affect on health and learning. This type of research must also involve interagency coordination and support.

Little is known about the incidence of health effects which may have a school-related environmental component, the substances to which children are exposed in

school, and connections between these exposures and health effects. Little is known about exposures in the school environment, where millions of American children spend a large portion of their childhood. No research or data collection efforts exist. Schoolchildren and their families deserve access to an agency which can help answer their questions, investigate concerns and provide information on exposures.

A network for identifying, investigating, responding to, and preventing environmental health problems in schools is needed to help protect children's health in school. Data systems that link environmental factors with health conditions need to be developed to obtain data for disease prevention and health promotion. Such a network would help to close the gap in knowledge regarding the prevalence and incidence of environmentally related conditions and environmental exposures. The Network urges the committee to support S. 2054, the "Nationwide Health Tracking Act of 2002."

Schoolchildren deserve to be protected from environmental hazards in their school; however, no standards exist providing such protections.

For example, in the States with Occupational Safety and Health Administration (OSHA) coverage, school employees are covered by standards including:

- a written hazard communication standard that lists all products with toxic ingredients, access to material safety data sheets, training for employees on chemical hazards;
- protective equipment for employees to use;
- a laboratory standard covering science teachers and technicians;
- emergency evacuation procedures; and
- access to any environmental monitoring performed by the employer.

However, students are not covered by these standards.

Also, as a result of queries from school personnel, the National Institute for Occupational Safety and Health (NIOSH), has visited schools for Health Hazard Evaluation (HHE) investigations, which assess risks and exposure and health consequences for employees when there are no standards. These investigations can be requested by employers and employees.

Just as is the case with OSHA, schoolchildren are not under the jurisdiction of NIOSH, so the institute does not have the authority to undertake investigations based on concerns about student risks, exposures and health effects. The Network believes school children deserve at the very least the level of protection and research afforded working adults—and probably even more protection.

We commend you for the leadership you have shown by holding this hearing. Again, thank you for the opportunity to testify.

ATTACHMENT 1.—PROTECTING CHILDREN FROM ENVIRONMENTAL TOXICANTS (CHILDREN'S ENVIRONMENTAL HEALTH NETWORK)

Every day, we are exposed to dozens, perhaps hundreds, of chemicals. Such extensive exposure is relatively new. Since World War II, thousands of new, primarily synthetic, chemicals have been discovered and introduced into commerce and our environment. In 1940, the annual production of synthetic chemicals was 1.3 billion pounds; in 1980, it was 320 billion pounds.¹ In 1999, more than 7 billion pounds of toxic chemicals were released into the nation's environment.² Chemicals are ubiquitous; traces of synthetic compounds are found in all humans and animals around the world.³

Both synthetic and natural chemicals, such as lead, once released into the environment, can harm the health of humans and wildlife.

The diverse and growing range of chemicals to which we are exposed means that today's children live in an environment vastly different from previous generations. Currently more than 70,000 chemicals are in use. For the majority of these chemicals, little is known about their health effects on children.⁴

CHILDREN ARE NOT JUST "LITTLE ADULTS"

Children, from conception through adolescence, are in a dynamic state of growth as their immature nervous, respiratory, reproductive, immune and other systems

¹Diagnosing and Treating Environmental Health Problems. Interview with Robert R. Orford, Minnesota Medicine 1991; 74:7–10.

²Based on data from the U.S. EPA's Toxic Release Inventory for 1999, posted on <http://www.scorecard.org/env-releases/us-map.tc>.

³Colborn T., Dumanoski D/ and Myers JP. Our Stolen Future. New York, NY:Dutton, 1996.

⁴Schaefer M. Children and Toxic Substances: Confronting a Major Public Health Challenge. Environmental Health Perspectives 1994; 102 (Supp 2) :155–156.

develop. Because of these developing systems, growing organisms can be more vulnerable to permanent and irreversible damage from toxicants than mature organisms.

Children experience the world differently than adults, meaning that children's exposures to environmental toxicants and their levels of exposure can vary dramatically from those of adults.

THE DELICATE CHOREOGRAPHY OF CHILDREN'S GROWTH

The primary task of infancy and childhood is growth and development. If growth and development are hampered, the chances of a healthy adulthood are dramatically decreased. Many different kinds of environmental insults have the potential to damage these natural processes, potentially leading to lifetime harm. It is often impossible to repair damages that occur in childhood.

Studies of the impact of exposure to environmental toxicants on development make clear that not just the degree and route of exposure but also the timing of the exposure affects the response.

Example: Development of the Nervous System. One of the critical organ systems to be considered in evaluating the effect of environmental toxicants on the fetus, infant, and child is the nervous system. Its anatomic and functional development is complex, intricate, and dependent on a precise sequence of events that occur at specific points in the development of the child. This exquisitely scripted pattern of development can be disrupted and irreparably injured by various agents at various stages, resulting in very specific alterations of neurologic and behavioral development. Key stages in the anatomical development of the central nervous system, beginning in utero and continuing into adult life, include:

- Formation of the neural tube, an embryonic structure that leads to all further brain development.
- Neuron proliferation, the growth of functional brain cells.
- Cell migration, the process by which cells move from one place to another to form the complex structure of the brain.
- Synaptogenesis, the process by which connections between neurons occur. Both the numbers and complexity of these interconnections affect the functioning of the brain.
- Cell death. The nervous system initially produces more neurons than it needs. The process of brain maturation requires the retention of some neurons and the natural loss of other neurons.
- Pruning of synapses. Synaptogenesis, which peaks at 2 years of age, creates more connections between neurons than are needed. Subsequently, there is an orderly process of loss of some connections and retention of others.
- Myelination, the process by which the communicating structures of neurons are covered to protect them and improve their function. Myelin functions like the insulation on an electrical cord.

Each one of these vital steps to a healthy brain and nervous system can be disrupted by environmental agents, resulting in permanent injury or impairment.

Because of children's developing systems, children can be more susceptible to harm caused by environmental agents. Exposures that for an adult may have little or no consequence can result in life-long harm for a child.

Children are different from adults in other ways. Because biochemical systems are still developing in the fetus and the child, their ability to detoxify and excrete toxins differ from adults. This difference is sometimes to their advantage, but more frequently children are not as able to excrete toxins and thus are more vulnerable to them.⁵

What we don't know about the effects and potential effects of environmental toxicants is far more than what we do know, not just for the nervous system (see box) but also for our reproductive, immune and other critical systems, as well as our state of knowledge for carcinogenic, endocrine and other health effects.

CHILDREN EXPERIENCE THE WORLD DIFFERENTLY

Children's exposures to environmental toxicants, and their levels of exposure, can vary dramatically from those of adults.

Pound for pound, children eat more food, drink more water, and breathe more air than adults do. Young children have higher metabolic rates than do adults.⁶ A

⁵Echobichon DJ and Stevens DD. Perinatal Development of Human Blood Esterases. *Clinical Pharmacology and Therapeutics* 1973; 14:41-47.

⁶National Research Council. *Pesticides in the Diets of Infants and Children*. Washington, DC: National Academy Press, 1993.

school-age child, on average, drinks twice as much water per pound of body weight and eats two to three times as much fruit per pound of body weight as an adult.⁷ Because of these differences, potential exposure to toxins that might be in the water or the air such as lead, pesticides, and nitrates is potentially greater for children.

Exposure differences are also a result of locations where children spend time, the activities in which children indulge, and children's level of personal hygiene. Thus, in identifying how children may be exposed to a chemical and the level of exposure, it is inadequate to simply extrapolate from adult exposure.

Behavioral differences, because of age and developmental stages, means that opportunities for exposure to environmental chemicals such as pesticides also differ. These differences exist both between adults and children as well as between children of different ages.

Some examples of children's behavior and activities that lead to exposure differences include:

- Young children spend hours close to the ground where there may be more exposure to toxins in dust, soil, and carpets as well as to low lying vapors such as radon or pesticides.
- Toddlers and primary school children may spend many hours sitting or lying on the floor while watching TV or playing games (2–3 hours/day). They place their fingers in their mouth frequently (9–10 times/hour); they are constantly touching their clothes (65 times/hour), objects (118 times/hour) and surfaces (97 times/hour). When they put their fingers in their mouth, whatever they have touched, they swallow.
- Children often eat snacks while sitting on the floor, thus whatever environmental chemicals are on the floor can adhere to both their hands and food and will be ingested through hand to mouth activities and through contamination of the food with dirty hands.
- Primary school children are likely to spend more time outdoors than toddlers or infants, typically in contact with dirt or grass and are also more likely to be outside barefoot than either older or younger children. They roll on the grass, tumble, and play games. They typically do not wash their hands after coming indoors and before eating. Whatever is on the grass may be absorbed through the skin on the body and feet or ingested when they put their hands in their mouth.
- Older children also spend a lot of time outdoors, typically playing organized games such as soccer or football, or hanging out. Their activities may include dermal contact with soil or grass.⁸

This type of behavior/exposure data do not exist for children older than 12. In addition to sources of exposure through play that may be similar to younger children, older children may have exposures similar to adults. For example, adolescents may work on farms or can be exposed to workplace toxins in shop class, vocational-education settings, and in work settings.

The data that do exist show that children are more heavily exposed than adults to toxicants such as pesticides. For example, studies that looked at biomarker levels for a commonly used organophosphate pesticide, chlorpyrifos, in children and adults

⁷ Guzelian PS, Henry CJ, Olin SS, eds. *Similarities and Differences Between Children and Adults: Implications for Risk Assessment* 1992. ILSI Press.

⁸ Busser HJ, Ott J, van Lummel RC, Uiterwaal M and Blank R. Ambulatory monitoring of children's activity. *Medical Engineering and Physics* 1997 19: 440–5; Connolly RD and Elliot JM. Evolution and ontogeny of hand function in N. Blurton-Jones (ed). *Ethological Studies of Child Behavior* Cambridge UP, London, 1972; Eaton WO and Yu AP. Are sex differences in child motor activity level a function of sex differences in maturational status? *Child Development* 1989 60:1005–11; Engstrom L-M. Physical activity of children and youth. *Acta Paediatrica Scand* 1980 Suppl 282:101–5; Fenske RA, Black KG, Elkner KP, Lee C, Methner M and Soto R. Potential exposure and health risks of infants following indoor residential pesticide application. *Am J. Public Health* 1990 80:689–93; Freedson PS. Field monitoring of physical activity in children. *Pediatric Exercise Sci* 1989 8–18; Freeman NCG, Ettinger A, Barry M and Rhoads G. Hygiene and food related behaviors associated with blood lead levels of young children from lead contaminated homes. *J Exp Assess and Environ Epi* 1997 7:103–18; Freeman NCG, Lioy PJ, Pellizzari E, Zelon H, Thomas K, Clayton A and Quackenboss J. Responses to the Region 5 NHEXAS Time/activity diary. *J Exp Assess and Environ Epi* 1999 in press; Gallahue DL. *Understanding Motor development: infants, children, adolescents* (2d ed) Benchmark Press, Indianapolis 1989; Quackenboss J, Pellizzari ED, Clayton A, Lioy PJ, Shubat P and Sexton K. Measurement and analysis of children's exposures to pesticides and PAHs. The 7th annual meeting of the International Society of Exposure Analysis, Nov. 2–5, Research Triangle Park, NC 1997; Reed KJ, Jimenez M, Lioy PJ and Freeman NCG. Quantification of Children's Hand and Mouthing Activities. *J Exp Assess and Environ Epi* 1999 in press; Tsang AM and Klepeis NE. *Descriptive Statistics Tables from a detailed analysis of the National Human Activity Pattern Survey (NHAPS) Data 1996 U.S. EPA/600/R-96/074*; Wiley JA. *Study of Children's Activity Patterns* California Air Resources Board, Sacramento, 1991.

found that the levels of the pesticide in children were substantially higher than in the adult population.

SUMMARY

In brief, a child's metabolism, physiology, diet, exposure patterns, and behavior are different than those of an adult.

A child is exposed to multiple toxicants in the course of her/his life, sometimes simultaneously, sometimes sequentially. Children have a longer life span than adults so they have more time to develop diseases with long latency periods that may be triggered by earlier environmental exposures, such as cancer or Parkinson's disease.⁹ The effects of multiple and/or cumulative exposures and their potential synergistic effects are not known.

Experience with a variety of chemicals, from alcohol to environmental toxicants like lead and mercury, has shown us that what is safe for the adult is not necessarily safe for the fetus, infant or child. Exposure levels that for an adult would have no impact or a transitory impact can have life-long negative consequences for a child.

For More Information: Contact the Children's Environmental Health Network at 202 543-4033 or visit the Network's Web site (www.cehn.org) which includes the Resource Guide on Pediatric Environmental Health.

About the Network: The Network is a non-partisan and multi-disciplinary national project whose mission is to protect the fetus and the child from environmental hazards and to promote a healthy environment. The Network's three areas of concentration are education, research and policy.

ATTACHMENT 2.—ENVIRONMENTAL HEALTH IN SCHOOLS (CHILDREN'S ENVIRONMENTAL HEALTH NETWORK)

Chemical toxicants and biological agents in the classroom, on the playground, in the science lab, or in other school facilities can lead to health risks and adverse learning conditions. They can affect many different body systems and impact health, learning, productivity, and self esteem.¹⁰

Children spend hours every day in and around their school facilities. However, few steps have been taken to protect children from environmental toxicants in the school environment.

Other than lead,¹¹ asbestos,¹² and radon,¹³ the Federal Government has not instituted requirements or guidelines that would protect children from the same chemical exposures that require employee notification and other worker protections. Although students may indirectly benefit from the Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) activities that cover school employees, OSHA and NIOSH have no jurisdiction for investigating the health impact of exposure to students. Additionally, only 26 States have OSHA coverage for their public employees.¹⁴

Specific health effects and toxicants of concern in the school environment include:

AIR POLLUTANTS, AIR QUALITY, AND ASTHMA

Children are especially susceptible to air pollutants. The airways of young children are smaller than those of adults. Inhalation of air pollutants that would produce only a slight response in an adult can result in a significant obstruction in the airways of a young child. Children have increased oxygen needs compared to adults, they breathe more rapidly and, therefore, inhale more pollutants per pound of body weight than adults. They often spend more time engaged in vigorous outdoor activities than adults.

⁹ Landrigan PJ and Carlson JE. Environmental Policy and Children's Health. *Future of Children* Summer/Fall 1995; 5(2):34-52.

¹⁰ California Department of Health Services. California Interagency Working Group on Indoor Air Quality in Schools, "Indoor Environmental Quality in California Schools: An Assessment of Needs and Opportunities". August 1999.

¹¹ Lead Contamination Control Act, P.L. 100-572.

¹² The Asbestos Hazard Emergency Response Act (AHERA) requires all schools to inspect and assess the condition of asbestos-containing material. (EPA regulations, Title 15, Chapter 53, Subchapter II).

¹³ In 1989, EPA recommended that schools nationwide be tested for the presence of radon. U.S. EPA, *Radon in Schools: Air and Radiation*. Second Edition.

¹⁴ OSHA Coverage of State and Local Government Workers

- Asthma is the leading serious chronic illness among children.¹⁵ The number of children with asthma in the United States is rapidly growing, increasing by 75 percent between 1980 and 1994.¹⁶ Asthma is the No. 1 cause of hospitalization among children under the age of 15.¹⁷

- Asthma is the leading cause of school absenteeism due to a chronic illness.¹⁸ The U.S. Environmental Protection Agency estimated that American children lost 17 million school days in 1997 due to the disease, and that parents lost 5 million work days in order to care for their children with asthma-related illness.¹⁹ Nearly 1 in 13 school-age children has asthma.²⁰

- The impact of asthma falls disproportionately on African-American and certain Hispanic populations and appears to be particularly severe in urban inner cities.²¹ These differences include both the incidence of asthma as well as mortality rates. In 1997, non-Hispanic Black children living in families with incomes below the poverty level were found to have the highest rates of asthma.²² Between 1980 and 1993, death rates for asthma were consistently highest among blacks aged 15–24 years.²³

- Major indoor triggers of asthma attacks include irritants such as commercial products (paints, cleaning agents, pesticides, perfumes), building components (sealants, plastics, adhesives, insulation materials), animal and insect allergens, environmental tobacco smoke, and molds.²⁴ Many of these triggers can be found in schools.²⁵

- Air pollutants such as particulate matter²⁶ and ozone²⁷ also can trigger asthma attacks.

- Although the causes of asthma are not yet known, one recent 10-year study found that ozone was linked to causing asthma, especially among physically active school age children living in high ozone communities.²⁸

- Nitrogen dioxide and sulfur dioxide decrease lung function in asthmatics.²⁹ Long-term exposure to air pollution (such as nitrogen dioxide and particulate matter) slows children's lung development over time. While these are generally thought of as outdoor air pollutants, these agents will be found in schools that keep windows open much of the year. In addition, children will encounter these pollutants during school hours while on the playground or sports field during recess, physical education and sporting events.

- Poor indoor air quality can reduce a person's ability to perform specific mental tasks requiring concentration, calculation, or memory.³⁰

- Air quality problems inside school buildings can arise from a variety of sources, such as mold growth from excessive moisture, chemical emissions, insufficient fresh air supply, pollutants, and high radon levels.³¹

¹⁵ American Lung Association, 2002

¹⁶ U.S. Environmental Protection Agency, *America's Children and the Environment*, December 2000.

¹⁷ ALA, 2002

¹⁸ U.S. Environmental Protection Agency. Indoor Air-Asthma Facts. Available at www.epa.gov/iaq/asthma/introduction.html

¹⁹ U.S. Environmental Protection Agency, National Costs of Asthma for 1997.

²⁰ U.S. Environmental Protection Agency. Indoor Air-Asthma Facts. Available at www.epa.gov/iaq/asthma/introduction.html

²¹ U.S. Environmental Protection Agency. Indoor Air-Asthma Facts. Available at www.epa.gov/iaq/asthma/introduction.html

²² U.S. Environmental Protection Agency, *America's Children and the Environment*, December 2000, p. 49.

²³ Centers for Disease Control and Prevention, "Asthma Mortality and Hospitalization among Children and Young Adults—United States, 1980–1993," *Morbidity & Mortality Weekly Report*, May 3, 1996.

²⁴ American Academy of Pediatrics, *Handbook of Pediatric Environmental Health*, 1999, p. 45.

²⁵ Environmental Law Institute, Research Report. *Healthier Schools: A Review of State Policies for Improving Indoor Air Quality*. January 2002.

²⁶ U.S. Environmental Protection Agency, 1996 Air Quality Criteria for Particulate Matter, Research Triangle Park, NC.

²⁷ U.S. Environmental Protection Agency, 1996 Air Quality Criteria for Ozone and Related Photochemical Oxidants, Research Triangle Park, NC.

²⁸ Rob McConnell, Kiros Berhane, Frank D. Gilliland, Stephanie J. London, Talat Islam, W. James Gauderman, Edward Avol, Helene G. Margolis and John M. Peters. "Asthma in Exercising Children Exposed to Ozone," *The Lancet*, Vol. 359, No. 9304, Feb. 2, 2002

²⁹ American Thoracic Society, "Health Effects of Air Pollution," *Am Journal of Respiratory and Critical Care Medicine*, 153:3–50, 1996.

³⁰ U.S. Environmental Protection Agency. "Indoor Air Quality and Student Performance" Indoor Environments Division. Office of Radiation and Indoor Air. August 2000.

³¹ Environmental Law Institute, Research Report. *Healthier Schools: A Review of State Policies for Improving Indoor Air Quality*. January 2002.

- 27 percent of schools in a U.S. General Accounting Office survey reported unsatisfactory ventilation. 22 percent reported unsatisfactory indoor air quality generally.³²
- An EPA investigation of 29 schools across the country found inadequate ventilation in most of the schools.³³

LEARNING DISABILITIES—DEVELOPMENTAL DISABILITIES

Seventeen percent of children under 18 have been diagnosed with one or more developmental disabilities. These disabilities include Attention Deficit-Hyperactivity Disorder (ADHD) and autism and are the result of complex interactions among genetic, environmental and societal factors that impact children during vulnerable periods of development.³⁴

- A recent Centers for Disease Control and Prevention (CDC) report indicated that approximately 1.6 million elementary school-aged children (7 percent of children 6–11 years of age) have been diagnosed with ADHD, which is also known as Attention Deficit Disorder (ADD).³⁵

- A recent National Institute of Environmental Health Sciences (NIEHS) study indicated that the incidence of ADHD may be greatly underestimated by school and public health officials. In the study, parents reported more than 15 percent of boys in grades one through five had been diagnosed with ADHD. Overall, more than 9 percent of all fourth and fifth grade children studied were taking medication to treat ADHD.³⁶

- Known or suspected causes of brain and nervous system disorders are exposure to lead, methylmercury, and some pesticides, therapeutic drugs and food additives.³⁷ Other chemical classes suspected of developmental neurotoxicity include cancer chemotherapy medications, polyhalogenated hydrocarbons, psychoactive drugs, and solvents.

MERCURY

Schools are places where children and elemental mercury may come together via thermometers and barometers, in laboratory courses or “show-and-tell.” Mercury can also be released through broken fluorescent light tubes or thermostats. Elemental mercury is a liquid at room temperature but readily volatilizes to a colorless and odorless vapor.

- Mercury is a potent neurotoxicant and children are particularly susceptible to mercury’s dangers. Mercury interferes with brain development and more easily passes into the brains of fetuses and young children than into the brains of adults.

- Both short- and long-term exposure to mercury vapor can lead to brain disorders. These include a wide variety of cognitive, personality, sensory and motor disturbances.³⁸

- Mercury poisoning is linked to kidney and liver damage and reproductive disorders.

- Exposure to high levels of mercury vapor, such as heating elemental mercury in inadequately ventilated areas, have resulted in fatalities.³⁹

- Mercury-containing products or spills must be properly handled. Even small mercury spills require specialists. Improper clean-up of a mercury release, such as vacuuming up the mercury from a broken thermometer, will spread the mercury into the air.⁴⁰

³² Environmental Law Institute, Research Report. Healthier Schools: A Review of State Policies for Improving Indoor Air Quality. January 2002.

³³ U.S. Environmental Protection Agency. Indoor Air-Schools. Frequently Asked Questions.

³⁴ In Harm’s Way. Toxic Threats to Child Development Project. Executive Summary. 1998. Greater Boston Physicians for Social Responsibility.

³⁵ “Prevalence of Attention Deficit Disorder and Learning Disability,” CDC’s National Center for Health Statistics, May 2002. Available at <http://www.cdc.gov/nchs/data/series/sr-10/sr10-206.pdf>.

³⁶ Prevalence of Medication Treatment for Attention Deficit-Hyperactivity Disorder Among Elementary School Children in Johnston County, North Carolina. Andrew S. Rowland, UNM Department of Family and Community Medicine. Available at <http://www.apha.org/news/press/2002-journal/feb02.htm>.

³⁷ Congressional Office of Technology Assessment report on neurotoxicity, 1990.

³⁸ ATSDR. Toxicological Profile, Mercury, <http://www.atsdr.cdc.gov/toxprofiles/tp46.html>. For specific information on memory loss, see the section on Health Effects, Section 2.2.1.4, Neurological Effects of Metallic Mercury <http://www.atsdr.cdc.gov/toxprofiles/tp46-c2.pdf>.

³⁹ American Academy of Pediatrics, Handbook of Pediatric Environmental Health, 1999, p. 147.

⁴⁰ American Academy of Pediatrics, Handbook of Pediatric Environmental Health, 1999, p. 152

- In July 2000, the National Academy of Sciences concluded that every effort should be made to reduce the release of mercury into the environment.

PESTICIDES

- Pesticide exposure may result in symptoms ranging from relatively mild headaches and skin rashes to paralysis and death. Some long-term illnesses linked to pesticide exposure may be subtle—such as neurological disorders or reduced cognitive skills.⁴¹ Long-term illnesses and those with delayed onsets, such as cancer, which may appear years after exposure, can also occur. Most exposures to pesticides cause no symptoms. Even when exposures are symptomatic, they are often misdiagnosed. This may mask the true extent of the illnesses caused by pesticides.⁴²
- Scientific reviews of the U.S. pesticide regulatory system identified important gaps in knowledge about the health effects of pesticides on children's developing systems as well as children's actual exposures to pesticides.⁴³ According to the American Academy of Pediatrics, "because the health effects of pesticide exposure on children are not well studied, an approach that reduces their exposure to these chemicals is desirable."⁴⁴
- Pesticide use in schools can be widespread. It can include "routine spraying," ostensibly to prevent the development of problems, in classrooms, hallways, the cafeteria, and other areas. This type of use may result in children being exposed to high levels of pesticides.⁴⁵ Additionally, pesticides can be used in the building when an infestation is noted and pesticides may also be used outside on lawns and playing fields.
- Information about on the amount of pesticides used in the nation's 110,000 public schools is not available. The Federal Government does not collect such data, and, as of 1999, only two States collected data on pesticide use in a manner that allows for identifying use in school facilities.⁴⁶
- From 1993 through 1996, about 2,300 pesticide-related exposures involving individuals at schools were reported, according to the American Association of Poison Control Centers (although these data are not believed to be complete).⁴⁷

LEAD

- Lead is a potent neurotoxin. Exposure to lead can cause a variety of health effects, including delays in normal physical and mental development in children, slight deficits in attention span, hearing, and learning disabilities of children. Long-term effects can include stroke, kidney disease, and cancer.⁴⁸
- Children of day-care-age who are in lead-contaminated buildings will be at highest risk of adverse outcomes from the exposure, but older children may be affected as well.
- A common source of lead exposure for children today is lead paint and the contaminated dust and soil it generates.⁴⁹ According to a report on the condition of the nation's school facilities by the U.S. General Accounting Office, schools built before 1980 were painted with lead paint.⁵⁰
- Children may also be exposed to lead through drinking water that has elevated concentrations from lead plumbing materials. Lead contamination in drinking water occurs from corrosion of lead pipes and it cannot be directly detected or removed

⁴¹U.S. General Accounting Office, PESTICIDES: Use, Effects, and Alternatives to Pesticides in Schools (RCED-00-17), November 1999, p. 3.

⁴²U.S. General Accounting Office, PESTICIDES: Use, Effects, and Alternatives to Pesticides in Schools (RCED-00-17), November 1999, p. 3.

⁴³National Research Council. Pesticides in the Diets of Infants and Children. Washington, DC: National Academy Press, 1993.

⁴⁴American Academy of Pediatrics, Handbook of Pediatric Environmental Health, 1999, p. 314.

⁴⁵American Academy of Pediatrics, Handbook of Pediatric Environmental Health, 1999, p. 314.

⁴⁶U.S. General Accounting Office, PESTICIDES: Use, Effects, and Alternatives to Pesticides in Schools (RCED-00-17), November 1999, p. 2.

⁴⁷U.S. General Accounting Office, PESTICIDES: Use, Effects, and Alternatives to Pesticides in Schools (RCED-00-17), November 1999, p. 2.

⁴⁸U.S. Environmental Protection Agency. Office of Water. National Primary Drinking Water Regulations. Consumer Factsheet on Lead.

⁴⁹U.S. EPA Office of Children's Health Protection, at <http://www.epa.gov/children/toxics.htm>.

⁵⁰U.S. General Accounting Office, *Report to Congressional Requesters. 1995 School Facilities: Condition of America's Schools*, GAO/HEHS-95-61., p. 27.

by the water system.⁵¹ According to the EPA, the longer water remains in contact with leaded-plumbing, the more the opportunity exists for lead to leach into water. As a result, facilities with on again/off again water use patterns, such as schools, may have elevated lead concentrations.⁵²

- Some support was provided to schools through the Lead Contamination Control Act of 1988 to identify and correct lead-in-drinking-water problems at schools, especially water coolers with lead-lined tanks.⁵³

SCHOOL BUSES AND DIESEL EXHAUST

- According to the EPA, diesel engine emissions contribute to serious public health problems including: premature mortality, aggravation of existing asthma, acute respiratory symptoms, chronic bronchitis, and decreased lung function. They have also been linked to increased incidences of various cancers in adults in more than 30 health studies.

- Diesel exhaust is known to be a major source of fine particles that can lodge deep in children's lungs, increasing the likelihood of asthma, chronic bronchitis, heart disease and even premature death.⁵⁴

- In the United States, nearly 600,000 school buses transport 24 million students to school daily. Collectively, U.S. children spend 3 billion hours on school buses each year.⁵⁵

- Children who ride diesel school buses are exposed to an excessive amount of toxic diesel exhaust. The excess levels on the buses are 23 to 46 times higher than levels considered to be significant cancer risks according to the U.S. Environmental Protection Agency and Federal guidelines. The diesel exhaust exposures are likely to result in an additional 23 to 46 cancer cases per million children exposed.⁵⁶

MOLD

- Mold grows on virtually any substance when moisture and oxygen are present, including ceiling tiles, carpets, wood and paper. Some molds, such as black molds or *Stachybotrys*, are known to produce potent toxins which can cause impaired breathing and cause allergies.⁵⁷

- Children can be exposed to mold in schools if the building has indoor air that is very damp or if there have been water leaks. Mold may grow within 48 hours if the building materials or furnishings are damp.⁵⁸

- The common symptoms of mold toxin exposure include headache, fatigue, diarrhea, nausea and respiratory irritation.⁵⁹

For More Information: Contact the Children's Environmental Health Network (www.cehn.org) at 202 543-4033 or the Healthy Schools Network (www.healthyschools.org) at 518 462-0632.

STATEMENT OF DEREK G. SHENDELL, SCIENTIST AND PUBLIC HEALTH PROFESSIONAL

I am a young scientist and public health professional in the field of children's environmental health working and training in California. My interests, however, have included urban areas in the United States and Latin America witnessing substantial population growth and migration to those cities, respectively. My dissertation for a multidisciplinary professional-track doctoral program at the UCLA School of Public Health concerns school indoor environmental quality (IEQ) of California pub-

⁵¹ U.S. Environmental Protection Agency. Office of Water. National Primary Drinking Water Regulations. Consumer Factsheet on Lead.

⁵² U.S. EPA, "Lead in drinking water in schools and non-residential buildings," EPA 812-B-94-002, April 1994, available at <http://www.epa.gov/safewater/consumer/leadinschools.html>.

⁵³ U.S. EPA, "Lead in drinking water in schools and non-residential buildings," EPA 812-B-94-002, Section 1—Background Information (p. 3-11), April 1994, available at <http://www.epa.gov/safewater/consumer/leadinschools.html>.

⁵⁴ U.S. Newswire via Comtex, February 7, 2002. Berkeley, California.

⁵⁵ Environment and Human Health, inc., Children's Exposure to Diesel Exhaust on School Buses, February 7, 2002. Available at www.ehhi.org.

⁵⁶ Natural Resources Defense Council and Coalition for Clean Air, No Breathing in the Aisles: Diesel Exhaust Inside School Buses, 2001.

⁵⁷ Stricherz, Mark. "Moldy Buildings: Troubling Trend For Many Districts". Education Week. September 26, 2001.

⁵⁸ "Mold in My School: What Do I Do". The California Department of Health Services. National Clearinghouse for Educational Facilities. March 2002.

⁵⁹ "Mold in My School: What Do I Do". The California Department of Health Services. National Clearinghouse for Educational Facilities. March 2002.

lic school classrooms, especially portable classrooms. The three projects included in the dissertation conducted quantitative measurements of toxic and odorous volatile organic compounds, thermal comfort parameters, and/or air exchange or effective ventilation rates. In addition, qualitative surveys and interview questionnaires were developed and conducted to assess potential indoor and outdoor pollution sources, moisture damage and mold growth, energy use, and custodian knowledge of HVAC operation and maintenance (O&M). Lessons learned have been shared with researchers in agencies and universities in California and Texas.

These projects, and others I work on at Lawrence Berkeley National Laboratory, Indoor Environment Department, address linking energy efficiency and IEQ parameters or the impact of local traffic from freeways on ambient and thus indoor air quality at schools. I constructed the annotated bibliography to be presented by Claire Barnett of the Healthy Schools Network, Inc. (Albany, NY). This document included papers and presentations from recent international conferences on school IEQ and health as well as three final LBNL reports on our relocatable classrooms study; copies can be available upon request.

Nevertheless, overall and especially in the United States, data on school IEQ and environmental health, including “best practices” for designs and O&M, are limited. Therefore, research and demonstrations projects in different geographical areas/climate zones should be conducted on:

1. Energy efficiency and IEQ linkages through adequate and/or improved ventilation and environmentally friendly building designs, e.g., interior finish materials and furnishings;
2. IEQ in relation to health, attendance, and productivity of teachers and students.

Without a doubt, public school populations will continue to increase across the United States, intensifying the need for clean, comfortable, and environmentally friendly school facilities, new or modernized, and proper O&M practices. The importance of energy efficient classrooms with low-emitting construction, interior finish, furnishing, teaching and cleaning materials is evident. Congress should fund the Healthy and High Performance Schools program.

STATEMENT OF GERI UNGER, THE FUNDERS’ FORUM ON ENVIRONMENT AND EDUCATION

Schools provide the opportunity for advancement of knowledge and creation of a civil society. The type of school facility that we provide our children is indicative of the care and respect we hope they will grow with. Schools must be safe, healthy and inspirational places for study. The full funding and implementation of the Healthy High Performance Schools Provision of the Leave No Child Behind Act will lead the way in insuring that every child in the USA has a seat in a school which is:

- Healthy
- Economic
- Environmentally friendly or “green”
- Community Centered
- Open to creative learning opportunities

Studies conducted over the last decade have shown that healthy schools, with proper ventilation, lighting, and high indoor air quality, make a positive difference in the health and academic performance of the children attending them.¹ Despite these documented results, both existing and new schools fail to provide students and staff with healthy and academically conducive buildings. The U.S. Department of Education in its 1999 report on the Condition of American Public Schools Facilities surveyed some 78,300 regular public schools,² and estimated that at least \$268 billion is needed for major rehabilitation and new construction of public schools across the country. USEPA estimates that one-half of our nation’s public schools have indoor air quality problems. This represents an enormous opportunity to renovate and design schools that provide a healthy educational environment for students and teachers, build social capital in surrounding communities, cost less to operate, and impact lightly on the ecological health of the environment. In spite of clear evidence that such design can result in better health, increased learning capacity, and cost

¹ There are numerous studies, among them the following available on-line at www.epa.gov/iaq/asthma/intor/index.html; www.epa.gov/iaq/schools/caseca.html; www.h-m-g.com; and www.innovativedesign.net

² Conditions of American Public Schools Facilities. 1999 U.S. Department of Education <http://nces.ed.gov/pubs2000/2000032.pdf>

savings, numerous obstacles to the implementation of these “high performance”³ schools exist.

Perhaps the biggest obstacle to school facilities being healthy and high performance is the lack of understanding among key decisionmakers and financiers of the benefits of environmentally healthy schools. Bringing together school facility managers, educators, school finance professionals, architects, and health professionals to create a strategy for implementing high performance schools is a necessary first step toward improving learning environments for all students and establishing schools as centers of community.

Schools are important focal points of neighborhoods and families, and the springboard for a civil society. As more children come from single parent and dual-income families, the school and its surroundings increasingly become a second home to children, especially in the elementary years. High performance schools provide a range of benefits including a healthy, non-toxic environment during the extended school day, enhanced learning ability and the opportunity for community leadership in health and environmental issues. Every day one in five Americans (approximately 55 million people) occupies a school building, and the majority of these occupants are children.⁴ Children and teachers spend at least 6 hours per day in school buildings. In many communities the extended school day for children in before- and after-school care can result in children in school facilities for up to 12 hours. Healthy Schools Network’s Claire Barnett suggests that “Children spend 90 percent of their time indoors and the great indoors is always dirtier, more crowded, and more polluted than the great outdoors especially in densely occupied, poorly maintained schools.”⁵ Increasingly, it is important to provide a healthy environment for these students and their teachers. Studies have shown that enhanced indoor air quality, reduction of air-borne pollutants, increased ventilation, increased day lighting, and access to safe outdoor spaces enhances student ability to concentrate and study.⁶ Asthma is the leading cause of school absenteeism due to chronic illness, accounting for over 10 million missed school days per year. Nearly one in 13 school age children has asthma, and the impact falls disproportionately on African American and certain Hispanic populations, particularly those living in urban areas⁷ (often representing distressed—both from an achievement and facilities standpoint—school districts, where students can least afford to miss school). In 1997–1998, 8.3 percent of non-Hispanic Black children living in families below the poverty level had asthma, the highest for all racial groups and income levels.⁸ Studies show that one-half our nation’s 115,000 schools have problems linked to indoor air quality that may include common asthma triggers such as pests, mold and dander, as well as cleaning agents, chemicals, pesticides, and poorly ventilated workspaces.

The economic aspects of school management are a key consideration in high performance schools. School funding is at the heart of local, State and Federal initiatives to make school facilities healthy and conducive to learning. As witnessed in the current California energy crisis, heating and cooling costs spare no facility or operation. The U.S. Department of Energy (DoE) estimates that schools spend more than \$6 billion annually on energy, and that they could save at least 25 percent of this amount through better design (even in renovated older buildings) through the use of energy-efficient and renewable energy technologies, and improvements in operations and maintenance. This will result in an overall savings of 1.5 billion dollars per year. DoE also estimates that school energy costs are approximately \$110 per student per year, with costs of wastewater processing and trash removal adding to a total of \$140 per student per year. High performance, sustainable design solutions can yield savings up to \$56 per student per year.⁹ As an example of the savings possible, it is estimated that improved energy efficiency in 91 public school buildings in Pittsburgh will save over \$750,000 per year. Given the uncertainty of energy markets, schools could be community leaders in reducing energy demand and increasing savings. The savings could be used toward physical facility improvement,

³“High performance” is also used as a term for describing student academic performance. We believe that just as students are held to high standards, school buildings should be designed for similarly high standards of performance, with buildings contributing to student opportunities and outcomes.

⁴USEPA Tools for Schools www.epa.gov/iaq

⁵Press release January 15, 2002 in reference to The Healthy and High Performance Schools amendment to the newly signed Federal education budget.

⁶<http://www.epa.gov/iaq/schools/caseca.html>; <http://www.h-m-g.com>; <http://www.innovativedesign.net>

⁷<http://www.epa.gov/iaq/asthma/intro/index.html>

⁸America’s Children and the Environment: A first View of Available Measures, USEPA December 2000.

⁹U.S. Department of Energy Rebuild America K–12 Program

reduction in class size, increased teacher salaries, and enhanced instruction. All schools, including those in distressed districts, should have the opportunity to realize these savings.

Environmental stewardship is another area where schools can play an important role. In a 1994 Roper Starch Worldwide Poll investigating young people's attitudes toward the environment, commissioned the National Environmental Education and Training Foundation,¹⁰ it was found that students, both from disadvantaged and non-disadvantaged areas, feel that protection of human health is by far the most important reason for protection of the environment, but that it is also important to protect the environment for plants and animals. In order to bring students into understanding their own place in nature, schools need to emphasize methods of reducing the environmental impact of buildings on their surroundings. Reduction in energy use results in reduction in air pollution including particulates that cause lung disease and ozone pollution, as well as green house gas and acid deposition.¹¹ Water conservation and appropriate land use are important aspects of environmental stewardship as well. Reduction in the use of toxics for cleaning and pest control is another contribution that schools can make as environmental stewards.¹² If schools use their collective purchasing power toward pollution reduction in materials, energy, and maintenance, the overall cost savings could be great, as could the non-monetary value of modeling environmentally responsible practices for the community at large.

Increasingly, schools are seen as centers of life-long learning for the entire community, not just the kindergarten through high school years. A national movement integrating schools more closely with the community is growing. In a Department of Education April 2000 Publication "Schools as Centers of Community: A Citizens' Guide for Planning and Design", the following six principles assert that, in order to meet the nation's needs for the 21st century, we must design learning environments that enhance teaching and learning to accommodate the needs of all learners:

- Serve as centers of the community
- Result from a planning/design process involving all stakeholders
- Provide for health, safety and security
- Make effective use of all available resources
- Allow for flexibility and adaptability to changing needs.

In order to have the above principles become useful to most communities, much work needs to occur across the broad scope of community stakeholders in changing the way schools are renovated and built.

Another important characteristic of healthy, "high performance", energy-efficient schools, is the use of the school building and nearby physical environment as a pedagogical tool. Place-based learning and environmental teaching techniques are increasingly recognized as essential tools in increased retention of science, social science, mathematical and language arts skills.¹³ Students investigating the "ecological footprint" or impact of the school building use science and math to conduct measurements and audits of energy, materials and resource consumption, and apply social studies and language arts to propose and communicate strategies for reducing the impact. Teachers, once trained in this method find that it opens the door for critical thinking, transfer of problem solving skills to other academic frameworks and cooperative learning. Studies have shown that scores on standardized tests are increased by using environment as an integrating concept. Additionally, research done indicates that 96 percent of teachers and principals surveyed thought that school design was an important part of a good learning environment. Furthermore, 92 percent said that they would be willing to devote nearly 4 hours per week to collaborating with facility designers, but that most had never been asked.¹⁴

The studies show that improved schools would improve our children's health and their ability to learn and achieve. The technology exists to build and renovate these building to higher standards. Using high performance building techniques saves money and is fiscally responsible as well as environmentally responsible by saving energy and water and preventing pollution. The wisdom exists to implement policies

¹⁰ <http://eelink.net/ROPER/html>

¹¹ From 1993 to 1998, 146 schools in Canada decreased their greenhouse gas emissions by the equivalent of 10,000 tons of carbon dioxide.

¹² Montgomery County Public Schools in Maryland cut its pest control costs from \$2,400 per school per year in 1985 to \$575 per year in 1992 by using Integrated Pest Management and less toxic alternatives.

¹³ Improving Student Learning: Using the Environment as an Integrating Context. 1997. Gerald A. Lieberman, Ph.D. State Education and Environment Roundtable.

¹⁴ B. Schapiro and Associates "Perceptions of Educators about School Design Issues," survey conducted for Heery International, Atlanta, GA. 1998. As seen in Harvard Education Letter. January/February 1999.

to support our children's health, and the greater community and environmental well-being. Governmental leaders can fully fund and support these measures that will yield results far beyond the Federal investment. I appreciate this opportunity to speak with you today and hope that these Federal Governmental mandates will be funded in the near future.

STATEMENT OF JAMES E. WOODS, PH.D., P.E., OF THE BUILDING DIAGNOSTICS
RESEARCH INSTITUTE

Mr. Chairman, I am Dr. James E. Woods, the Executive Director of the Building Diagnostics Research Institute, Inc., a not-for-profit organization in Bethesda, Maryland. I am pleased to have the opportunity this morning to appear before this hearing on "Green Schools Initiatives," and I want to commend the committee for examining the very important problem of classroom facilities as it relates to health and performance of our students and teachers.

Before offering some recommendations, let me take a moment to place this issue in perspective. For the past several decades, an increasing awareness has emerged of the direct relationship between indoor environmental (IEQ) control and health. However, the dearth of scientific, quantifiable data characterizing the relationships between this environmental control and student performance is a detriment to educational outcomes in our Nation. I was extremely pleased to note, Mr. Chairman, that the first recommendation you cited in your opening statement this morning was the need for credible, scientific data. The need for more scientific research has also been cited by the National Research Council and by the General Accounting Office. At the K-12 level, as various witnesses have testified this morning, the effects of indoor exposures can result in life-long impacts on student health, learning, and performance.

Schools in the United States are on average 42 years old and have four times as many occupants per square foot as typical office buildings. On any given day, one in five Americans spends at least a part of the day in a school building. A series of surveys taken by the General Accounting Office from 1994 through 1998 indicates that more than half of U.S. schools have deficiencies that adversely affect indoor environmental quality. But despite these warnings to the public and the education community, there is a lack of reliable, scientific data quantifying the relationships between indoor environmental quality and the performances of building occupants. I am not aware of any scientifically designed study that has directly measured the impact of the total exposure of thermal, indoor air quality, lighting and acoustic stressors on the performance of teachers and students under actual classroom conditions. Moreover, there has never been a study on a national level seeking to characterize the extent of unhealthy schools in the U.S. and the concomitant impact on learning outcomes. Yet the Department of Education has been mandated to submit a report to Congress no later than 18 months from the enactment of the "No Child Left Behind Act of 2002" characterizing the problem of unhealthy schools in the United States.

How are we to begin the task of measuring the problem of unhealthy schools in America? A first start, Mr. Chairman, is the leadership your committee has shown today by calling this hearing and bringing greater public attention to the issue. Those of us who have lived with this problem for some time have come to the conclusion that the classroom environment is part of the learning experience of the students, and it is vital that public attention be focused on the need for improved school facilities, as you are doing here today with the array of witnesses you have brought together for this hearing.

As I stated earlier, Section 5414 of the Elementary and Secondary Education Reauthorization Act of 2002 (popularly referred to as the "No Child Left Behind Act") mandates the completion of a study by the U.S. Department of Education and submission of a report to Congress within 18 months of enactment (which was January 8, 2002) in which the problems unhealthy schools at the K-12 level in America are to be characterized and in which recommendations are to be made to Congress for remedial actions. I believe that Senator Clinton, a member of this committee who has demonstrated leadership in this area, was responsible for this mandate. Implementation of this study is essential, Mr. Chairman, if we are to begin the process of obtaining quantifiable, scientific data to which you alluded at the outset of today's hearing. I would like to offer some recommendations to the committee for how we might go about conducting a study such as the one envisioned by Section 5414 of the No Child Left Behind Act, as well as suggest the need for a truly national study of the magnitude of this problem that would go well beyond the requirements of the Section 5414 provision.

In evaluating and characterizing the performance of school facilities, it is important to use valid and reliable methods, such as building diagnostics, which are translated from medical diagnostics procedures and require hypothesis formulation and testing. Building diagnostics may be used for investigating of buildings that have IAQ complaints as well as for assuring that buildings are performing as intended. The principles of building diagnostics are focused on defining the nature of the problem, e.g. detection of faults in system performance, so that interventions can be implemented mitigation before failure occurs in exposure or human responses. These procedures also embody the concept that objective and measurable performance criteria should be defined as an initial step in conducting building diagnostics.

I recommend to the committee that, as a precursor to a national study of unhealthy schools, the initial characterization of the problem should be drawn from an in depth analysis of a small number of actual cases of schools where complaints about the indoor environment in schools have encompassed reported illness, confirmed by a medical diagnosis, and resulted in litigation. Thus, all of these initial cases would have advanced at least as far as the discovery phase and beyond a preliminary motion to dismiss. I also recommend that, following the initial study of litigation cases, a LEXIS/NEXUS search be undertaken and a similar analysis be performed on available litigation cases to broaden the data base of what is known about "unhealthy schools" and their impact on students and teachers.

This approach I am advocating will enable us to develop a baseline of the building performance of unhealthy schools over time, measured against objective performance criteria that enable us to identify indicators of unhealthy schools. I believe that any school building that has been involved in litigation over allegations involving "Building Related Illness" satisfies per se the definition of an "unhealthy school." By an in depth analysis of the exposure factors and related health effects presented in the litigation cases, we will then be able to create a data base for defining an unhealthy school. A further expansion of this proposed data base can also be made through a review of existing data from the General Accounting Office and the U.S. Department of Education. Taking into account differences in the size, geographic location and grade levels within the schools, the overall approach I am advocating will enable the construction of a baseline profile of the typical unhealthy school in the United States.

Once we have this baseline of the building performance of unhealthy schools, it will be possible to profile the types of exposures, system performance, and other factors such as deferred maintenance that cause adverse health effects in school children, and ultimately to develop recommendations to Congress for improvements in school facilities.

I believe that the unhealthy schools facilities study mandated by Congress, what I will refer to as the "baseline study," can be completed within the statutory timeframe ending July 8, 2003 if this committee and other interested committees urge the Department of Education to move ahead with the implementation of Section 5414. The larger national study I mentioned earlier will involve the acquisition of data in schools and will have to await the outcome of the "baseline study" and the input from other groups and researchers that are looking at these problems. Such a study will require a substantial dedication of resources, probably in the range of \$10-\$30 million over a period of 3 to 5 years, as in other health effects studies, in order to complete a study that is truly national in scope. I urge this committee to work with the Senate Committee on Health, Education, & Labor and with the Committee on Appropriations to earmark the necessary funding beginning in fiscal year 2004 to undertake a national study on unhealthy schools.

We at The Building Diagnostics Research Institute, Inc., (BDRI) are very interested in working with you, Mr. Chairman, and with other Members of Congress, in securing the implementation of Section 5414 and enactment of other measures that will improve school facilities and the indoor environment of the nation's classrooms. We are an independent not-for-profit research organization. We strive to provide the highest level of research, education and training, and public outreach on issues related to the effects of building performance on health, safety, security and productivity, utilizing an interdisciplinary approach to the advancement of the arts and sciences associated with the control of indoor environments.

As you have stated very succinctly here this morning, Mr. Chairman, the vision that is required to promote "healthy schools" is to measurably increase our understanding through the use of quantitative, reliable and accurate methods of diagnosing the performance of school facilities. While we speak of characterizing the problem of "unhealthy schools," let us remember that our goal is not just the absence of illness, but also the promotion of healthy classroom environments that will enhance student and teacher performance. The goals of healthy classrooms and

schools facilities, improved system performance, increased environmental security, and increased energy efficiency are all closely related. This hearing and others like it will contribute to the increased public understanding that can be achieved through interdisciplinary leadership that focuses on improving the performance of school facilities. I look forward to working with you, Mr. Chairman, by using our diagnostics protocols and outreach programs for the benefit of the general public, policymakers and building owners, and those responsible for the design, construction and operations of school buildings.

Thank you, Mr. Chairman, and I would be glad to respond to any questions you may have.

STATEMENT OF CHRISTINE GUSTAFSON, TREVOR, WI

DEAR COMMITTEE MEMBERS: We need both, effective national indoor air quality standards and an illness tracking system for schools. The lack of sufficient funding for school operation and maintenance is like, painting a room with a paintball gun and is not conducive to a good learning.

My asthmatic son Glenn, is highly allergic to mold, mildew, and fungi. He missed 32 days of school last year in the first two months of third grade. For him 40 percent humidity is too low and 50 percent humidity is too high. I monitor & record his peak flow breathing levels 3x a day to document irreplaceable loss of class experience and productivity, which is detrimental to his educational attainment. He is a part of a minority group that are the labor force replacements that must be able to support this country's ever increasing elderly population's retirement and healthcare benefits.

His school is down gradient of high-density development built when drain it & get it out of there fast was the acceptable method of stormwater management. Three maintenance guys are responsible for 211,000 sq. ft. plus 80 acres of school property. Their duties include setups for programs, meetings and events; heating, snow removal & salting; repairs and preventative maintenance. Each custodian has to clean 29,000-sq. ft. per day, which equates to just over 60 sq. ft. per minute in a normal day. The per student debt last year was \$7239.00, not including the local high school. Glenn's school used emergency funding for repairs because a recent referendum failed by 85 percent. The voting majority's average income is about \$29,000 which is not a living wage.

Wisconsin capped school operation costs, froze school construction costs, and will not recognize the extra 30 million dollars it estimates schools could need this year. It does not allow developers to be charged impact fees for facilities owned by school districts; and has a law which basically says "you can not build anything worse than dirt." In this state, built to code is nothing to brag about.

Children are the most valuable resource in the United States, which clearly needs to have healthier schools in this global economy where only the smartest nation will survive.

STATEMENT OF JOELLEN LAWSON, SPECIAL EDUCATION TEACHER, FAIRFIELD, CT

My name is Joellen Lawson and I was a Special Education teacher at McKinley School from 1991-1998. This is the elementary school in Fairfield, CT that was permanently shut down in October 2000 due to severe mold contamination. Although it is painful to talk about, I am here today because I feel a strong moral obligation to share how long-term and acute mold exposure ended my twenty-three year teaching career and has seriously damaged my health and financial security. Mine is a cautionary tale that warns us of what can happen in the absence of enforceable air quality standards. My case demonstrates that there are not enough safeguards to guarantee teachers and students a safe and healthy environment to work in. Thankfully, those of you in the legislature are acknowledging and addressing these important issues as you seek solutions to remedy the problem of poor air quality in the schools. I only wish the current level of public awareness and the legislative initiatives being proposed had been established a decade ago.

In 1991, I joined the faculty at McKinley as a part time Special Ed. Teacher. I had just completed my second master's degree (ironically in Health Education) and was taking additional courses in order to become certified in Elementary Education. My volunteer work in the community included presenting workshops for statewide conferences for CACLD (CT Association for Children with Learning Disabilities) and serving on the board of directors for the ADD Society of Ffld County (a support group for parents of children with attention deficit disorder). My expertise in teaching children with ADD was the focus of my work as a seminar leader for the Amer-

ican Institute for Creative Education as well as an educational consultant and tutor for the ADD Institute of Westport. So in summary, I was very invested in a career I would have described as dynamic, multifaceted and very fulfilling.

My first recollection of not feeling well occurred during the 1992-1993 school year. That particular year I was teaching in room 118 which doesn't have any windows. By noon each day I was suffering from headaches, burning eyes, mental fatigue and the beginnings of a chronic cough. I vividly recall a conversation I had with my principal regarding my health problems that appeared to be caused by "something" in that room. Fortunately, by the end of the school year the principal did honor my request for a transfer to a classroom with a window.

From 1993-1997, my classroom was a very small office in the library with a window. At first, my symptoms did improve. In 1994 my position was increased to full-time and as I began to spend more time in the building my cough worsened and new symptoms emerged. Now in addition to burning eyes, my tongue was usually swollen; I had visible hair loss on my head and my eyelashes started falling out. By 1995-1996, the coughing spells worsened and during one of them I herniated a disk: More neuromuscular difficulties included muscle spasms, tingling sensations and occasional tremors. I did consult several doctors, but blood tests and lung X-rays failed to pinpoint a cause. Finally, in September 1997, I was delighted to be assigned to a standard sized classroom with ample closets and windows. The previous occupant had packed the closets with books, kits and teaching materials. It wasn't until May of 1998 I had the time to clean them out. Over the course of four days, I removed twenty bags of mold contaminated materials. As I do have a history of allergies and asthma I did expect some exacerbation of my symptoms. However, I never anticipated the long-term consequences that would result. By the second day of cleaning, I asked the custodian for help because I was getting dizzy and quite sick to my stomach. The following Monday I awoke at 1:00 am and the room was spinning. For the next ten hours I suffered from intense vertigo, diarrhea, vomiting and tremors. When I was admitted to Danbury Hospital's emergency room, the attending physician told me that a virus or food poisoning were the likely culprits for those ailments after I proposed my theory that the moldy materials could have triggered the incident.

Two days after my trip to the emergency room I felt compelled to return to work to finish my end of the year obligations. Completing job tasks was hampered by dizziness, intermittent nausea and the sensation that my brain was swollen. Little did I suspect that after June 1, 1998 my life would never be the same. At no time before this had I felt so seriously ill. Yet, I still expected to fully recover over time. So regaining my health was the goal for the summer of 1998.

By late June my symptoms not only persisted, they were worse. The dizziness had not abated and was further complicated by a very severe ear infection. No hearing loss was ever detected by the ENT, but since then I have difficulty tolerating a normal sound volume. Going to a mall or eating out at a restaurant can be physically debilitating because of my inability to cope with the noise level characteristic of such places. Other sensory disturbances included increased sensitivity to light, an inability to control eye tracking and intermittent blurring. Balance problems made walking a task that was demanding and required considerable effort. There were days when the floor appeared tipped to one side. My kinesthetic experience could be best expressed as feeling as though I was still in motion while I was at rest. By August, the consensus of two primary care physicians, an ENT and a neurologist was that I was afflicted with a "vestibular dysfunction." The vestibular system consists of the brain, spinal cord, eyes, skin, muscles, joints of the body and inner ear. It is responsible for maintaining one's sense of equilibrium or balance. However, a vestibular dysfunction could not account for other symptoms such as night sweats, low-grade fevers, swollen glands, an excessive need to urinate, a sharp pain behind my eyes and terrible migraine headaches. Two peculiar symptoms: a black growth on my tongue and mild bleeding from my ears were also reported to my doctors.

The primary care physician who would eventually fill out my disability paperwork and coordinate input from the many specialists who evaluated my symptoms kept extremely detailed records. In August 1998, she did record my comments about teaching in a moldy classroom and that my most debilitating symptoms manifested within days of removing moldy materials from the classroom. Not one of the well meaning medical professionals involved in my case recognized the significance of this information until nearly three years later.

Assured by my doctors that a vestibular dysfunction would repair itself within a two-three month period, I attempted to return to work in October 1998. Had I truly understood my illness I would have realized the personal purchase of a HEPA filter and half-day schedule would not protect me from another assault to my immune system. Within weeks I suffered another major episode of vertigo and simultaneous

vomiting and diarrhea followed by heart palpitations and shortness of breath. For the first time I was painfully aware that my cognitive functioning, especially short term memory problems were interfering with my ability to communicate with others and teach effectively. Word retrieval and multitasking were excruciatingly difficult. Finally, I accepted that I could not will myself into wellness and a formal medical leave of absence was necessary. I was granted a medical leave of absence for the 1999-2000 and 2000-2001 school years. During my medical leave my primary care physician ordered extensive medical testing to rule out everything from multiple sclerosis to a brain or vestibular tumor to Lyme's disease.

The closing of McKinley School in October 2000 was a turning point. Soon after, I contacted Dr. Eileen Storey (UConn Occupational Medicine), John Dorland (FEA president), and Mary Fitzgerald (Pupil Personnel for Ffld Public Schools) to share my story. The complex health, career, financial and legal implications raised by the shutdown of McKinley were totally overwhelming. I began by addressing those questions most pertinent to my health and career issues. I wondered: Had my illness been preventable? Had my thoughts about the mold in my classroom which had been dismissed and ignored been on target from the beginning? If this were true, would there be changes in my prognosis and treatment? Could there be magic bullet that would enable me to return to work in September 2001 when my medical leave would have expired?

Initially, I did not speak out publicly about these matters because without further proof I believed it would be irresponsible to alarm those McKinley teachers, parents and students who were already traumatized by what had taken place. By the spring of 2001, I was personally convinced by mounting evidence that my illness directly resulted from breathing in toxic mold spores while teaching at McKinley. I utilized numerous resources before coming to this conclusion although my appointments with Dr. John Santilli were pivotal. Dr. Santilli had already treated fifty McKinley staffers and students who became ill from mold exposure. In collaboration with a mold toxicologist, he had analyzed the results of air samples taken from McKinley. After extensively reviewing my medical records, Dr. Santilli confirmed that the respiratory, digestive, neurological and sensory disturbances I had been suffering from were consistent with exposure to the high levels of mold (*stachybotrys*, *aspergillus* and *penicillium*) found in classrooms I had been teaching in during my seven years at McKinley.

The good news was that I finally had some definitive answers. The bad news was there would be no magic bullet to cure me and Dr. Santilli could not recommend I return to work in the fall. Despite all the evidence to the contrary, I had been clinging to the hope of holding onto my tenure in Fairfield. My disappointment was further compounded when my request to extend my medical leave was denied by officials in Fairfield. It was devastating to file for a disability retirement at the age of forty-six, some twenty years early.

As I sorted out my health and career issues, I was also wrestling with legal and financial ones. In November 2000, my husband and I met with a workman's compensation attorney who warned us that proving an environmentally triggered illness would be very challenging, especially because at that time I lacked a medical advocate to back me up. She also cited probable complications with statute of limitation laws as 2½ years had transpired since the onset of my disabling condition. Later, other attorneys declined to take my case because of the statute of limitations.

This legal predicament leaves me dealing with serious financial consequences. Despite the disability payments I receive, my income has been substantially reduced and concern for my long term financial security is a considerable source of anxiety. Living on a fixed, reduced income places stringent restrictions on my lifestyle and denies me access to resources that could contribute to my recovery. For example, Dr. Santilli suggested I hire someone to help clean my house in order to avoid contact with allergens that testing has shown to compromise my immune system. However, I simply can no longer afford such luxuries.

Now if we fast forward to my current situation, it is clear that my debilitating condition has robbed me of my professional identity and significantly altered my personal and social life. Essentially, I am housebound with the exception of physical therapy or doctor's appointments which my parents and husband usually drive me to. A tremendous loss of independence comes from not being able to drive a car. Since June 1, 1998, I rarely drive due to safety concerns for myself and others. In order to get behind the wheel of a vehicle, one should be able to turn their neck and head from left to right: and move their eyes from the rearview mirror to the view of oncoming traffic with ease. I am sure most people take for granted their ability to perform such tasks. In my case, I have days when the act of moving my eyes to look up or down can elicit visual blurring, nausea and a loss of balance. This can happen without the introduction of additional demands on my vestibular system

such as movement. When this occurs, I cope best by remaining as still as possible and aiming my gaze directly in front until the episode is over (which may last minutes, hours or days). At times the vertigo, vomiting, tremors and full body sweats have been so incapacitating that I have been unable to walk from the bedroom to an adjoining bathroom and have had to use a bedpan. During these episodes, my husband utilized many vacation days from work because I was unable to care for myself. As you might imagine it is hard to schedule plans due to the highly unpredictable nature of my symptoms as they wax and wane on a day to day basis.

Another especially disconcerting component to this cluster of symptoms has been my inability to lay flat, with my head down since June 1, 1998 without considerable discomfort. The discomfort may manifest as severe eye, neck, or headache pain as well as lightheadedness, dizziness, tremors or full blown vertigo. To compensate I usually sleep on my left side elevated by two pillows. As a result of my inability to lay in a supine position, the quality of my sleep is compromised and I developed adhesive capsulitis in January 2001. Adhesive capsulitis "frozen shoulder" is a painful condition that limits the use of my left arm and shoulder, making such tasks such as washing or fixing my hair, tucking in my shirt or almost any task requiring the use of two hands at best, challenging.

My overall stamina is further depleted by increased sensitivity to environmental allergies, shortness of breath and a chronic cough. These respiratory ailments put an end to my favorite hobby, singing, which had been a wonderful source of joy and self expression during eight years of vocal training. I still miss my weekly voice lessons and performing in two to three recitals each year.

On good days, I am able to do simple chores such as doing dishes, laundry and cooking as long as I take rest breaks every few hours. This is a far cry from the active, physically fit person I once was. In 1991, I practiced yoga regularly and could do a forty-five minute aerobic routine, three to four times a week. Now if I am lucky I can exercise at a moderate pace for ten to fifteen minutes. One area where I have observed improvement has been in the gradual return of my cognitive abilities, particularly short term memory skills.

Last Fall when I agreed to be interviewed for NEA Today and Schoolhouse News, my motivation was to warn others of the dangers of poor indoor air quality before it is too late. I have learned my case is not an isolated one as teachers throughout the U.S. have told me about mold contamination in their schools and the physical symptoms they have endured which are sadly reminiscent of mine. Their stories have strengthened my resolve to campaign for legally enforceable air quality standards. I believe if such policies had been in place the McKinley School disaster might have been averted. The extensive and extremely hazardous mold contamination at McKinley would not have been allowed to fester for years. The "deferred maintenance" that contributed to the building's deterioration would not have been so readily tolerated had regular air quality testing been implemented.

Those of us with pre-existing conditions such as allergies and asthma who are most vulnerable to the effects of toxic air quality would have been more cognizant of the risks we were undertaking by simply coming to work at a sick building. I only wish I had been armed with the knowledge I have acquired since McKinley was shut down, before I was assigned there in 1991 and especially after my trip to the emergency room in 1998.

Many of the health and career decisions I made in 1998 would have been dramatically different had I comprehended the connection between my illness and work environment. First of all, I would never have exposed myself to such air quality again by re-entering the building. Secondly, I would have immediately filed for a workman's compensation claim. Finally, I would have sought the advice of a physician with a background in mold related illnesses. In that way, I might have avoided the waste of time, energy and expense of meeting with fourteen medical practitioners who ordered testing and the use of medicines which for the most part actually aggravated my condition.

Believe me, I do not relish exposing parts of my medical history in a public forum such as this. I realize doing so will not repair my health, fix my financial woes or bring back the daily contact with my students that made my job such a deeply satisfying one. However, if in some way my testimony helps to protect the basic civil right of teachers and students to work in safe and healthy environment, then this will have been worth it.

Thank you for your kind attention.